Overall, the local ordinances, policies and programs relevant to hazard mitigation are highly effective in terms of hazard mitigation. Several ordinances should be revised to provide stricter development standards.

Review of these existing plans, policies, ordinances and programs has resulted in specific actions to create new ordinances (or revise existing ordinances) that would serve to reduce the hazard vulnerability of the Town of Linden. Land use, transportation, utility, recreation and capital improvement plans are designed to provide orderly growth and development without endangering the public health, safety and welfare. Preparation, review and revisions of these types of plans are a continuous process. Goals, Actions and information contained within this Hazard Mitigation Plan will be reviewed and incorporated into the planning process. Additionally, the five-year review of the Hazard Mitigation Plan will include an examination of existing plans, policies, ordinances and programs as part of the Capability Assessment as well as Mitigation Strategies.

Legal Capability

Local governments in North Carolina have been authorized by the State legislature to carry out four broad governmental powers: Regulation, Acquisition, Taxation and Spending. As mentioned previously, the Town of Linden relies upon Cumberland County for regulatory and taxation staffing functions. The following is a summary of North Carolina enabling legislation granting these broad governmental powers relevant to hazard mitigation.

Regulation

General Police Power

All local governments in North Carolina have been granted broad regulatory powers in their jurisdictions. North Carolina General Statutes [NCGS] bestow the general police power on local governments, allowing them to enact and enforce ordinances, which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people and to define and abate nuisances (including public health nuisances).

Hazard mitigation can be included under the police power to protect the public health, safety, and welfare, therefore municipalities may include requirements for hazard mitigation in local ordinances. municipal governments may also use their power to abate nuisances, which could include by local definition, any activity or condition making people or property more vulnerable to any hazard [NCGS Chapter 160A, Article 8 Delegation and Exercise of the General Police Power to Cities and Towns].

Building Codes and Building Inspection

Counties and municipalities can engage in risk reduction measures focusing on strengthening building codes and requiring retrofitting of existing structures and facilities to protect the public health safety, and welfare in the event of a natural hazard.

North Carolina has a State mandatory building code, which applies throughout the State [NCGS 143-138 (c)]. However, local jurisdictions may adopt codes for their respective jurisdictions if approved by the State as providing ~~a~~dequate minimum standards" [NCGS 1143-138 (e)]. Local regulations cannot be less restrictive than the State code. Exempted from the State code are public utility facilities other than buildings; liquefied petroleum gas and liquid fertilizer installations, and farm buildings outside municipal jurisdictions. No State permit may be required for structures under $20,000. (Note that exemptions apply only to State, not local permits).

The State legislature has also empowered municipal governments to carry out building inspections. NCGS Chapter 160A, Article 19, Part 5 empower municipalities to create an Inspections Department, and enumerates its duties and responsibilities, which include enforcing State and local laws relating to

the construction of buildings, installation of plumbing, electrical, heating systems, etc; building maintenance; and other matters.

Land Use

Through various land use regulatory powers, granted by the State, local governments can control the amount, timing, density, and location of new development. These growth characteristics can determine the level of vulnerability of an area in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enact and enforce zoning, subdivision, floodplain, stormwater and watershed ordinances.

Zoning

Zoning is the most basic tool available to control the use of land. The North Carolina General Statutes 160A-381 and 153A-340 give broad enabling authority for counties and municipalities to use zoning as a planning tool. Counties may also regulate inside a municipal jurisdiction at the request of a municipality, as set forth in NCGS 160A-360(d). The statutory purpose for the grant of power is to promote the health, safety, or the general welfare of the community. Land ~~u~~ses" controlled by zoning include the type of use, such as residential, commercial, industrial, as well as minimum specifications for use such as lot size, building height, setback, density, etc.

Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts [NCGS 160A-382; 153A-340]. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text. Currently, the Town of Linden is not zoned; but a committee has been formed to review the proposed Linden Zoning Ordinance.

Comprehensive or Master Planning

Within North Carolina, local governments are required to create or designate a planning agency in order to exercise the regulatory powers related to land use [NCGS 160A-387; 153A-321]. The planning agency may: prepare studies for an area/neighborhood; determine objectives; prepare and adopt plans for achieving objectives; develop and recommend policies, ordinances and administrative means to implement plans; and perform other related duties [NCGS 160A-361; 153A- 321].

NCGS 160A-383 requires that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted ~~in~~ accordance with a plan," the existence of a separate comprehensive planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community**.**

Subdivision Regulation

Subdivision regulations control the division of land into parcels for the purpose of building a development or sale. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street or a change in existing streets [NCGS 160A-376]. Flood-related subdivision controls typically require that developers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filing or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division of land. Subdivision regulation is limited in its ability to directly affect the type of use made of land or minimum specifications for structures.

Floodplain Regulation

The North Carolina legislature passed the ~~A~~ct to Prevent Inappropriate Development in the One Hundred-Year Floodplain and to Reduce Flood Hazards" to regulate development within floodways [NCGS 143-214.51-214.61]. It serves as a risk reduction or risk elimination tool depending upon local

government use. The purpose of this law is to minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage; prevent and minimize loss of life, injuries, property damage and other losses in flood hazard areas; and promote the public health, safety, and welfare of citizens.

The statute directs, rather than mandates, local government to designate a one hundred-year floodplain; adopt local ordinances to regulate uses in flood hazard areas; enforce those ordinances; and grant permits for use in flood hazard areas that are consistent with the ordinance. The statute established minimum standards for local ordinances and provides for variances for prohibited uses such as:

(a) A flood hazard prevention ordinance adopted by a county or city pursuant to this part shall, at a minimum:

1. Meet the requirements for participation in the National Flood Insurance Program and of this section.
2. Prohibit new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities in the 100-year floodplain except as noted in section (b) below.
3. Provide that a structure or tank for chemical or fuel storage incidental to a use that is allowed under this section or to the operation of a water treatment facility may be located in a 100-year floodplain only if the structure or tank is either elevated above base flood elevation or designed to be watertight with walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydro dynamic loads and the effects of buoyancy.

(b) A flood hazard prevention ordinance may include a procedure for granting variances for uses prohibited under G.S. 143-215.54.

(c) A county or municipality shall notify the Secretary of Crime Control and Public Safety of its intention to grant a variance at least 30 days prior to granting the variance. A variance may be granted upon finding that all of the following apply:

1. The use serves a critical need in the community.
2. No feasible location exists for the location of the use outside the 100-year floodplain.
3. The lowest floor of any structure is elevated above the base flood elevation or is designed to be watertight with walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.
4. The use complies with all other applicable laws and regulations.

Also, the statute ensures that local ordinances meet the minimum requirements of participation in the National Flood Insurance Program (NFIP), which will afford residents the ability to purchase flood insurance through the NFIP. Additionally, communities with such ordinances will be afforded priority in the consideration of applications for loans and grants from the Clean Water Revolving Loan and Grant Fund.

Acquisition

Municipal governments can eliminate the risk of hazards through their power to acquire property, either in fee or lesser interest such as an easement. This removes the property from the private marketplace, thereby eliminating or reducing the possibility of inappropriate development. North Carolina legislation empowers counties and municipalities to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain [NCGS Chapter 160A Article 11].

Taxation

The power to levy taxes and special assessments has been delegated to municipal governments by the North Carolina legislature [NCGS 160A Article 9]. This power allows municipalities to set preferential tax rates for areas unsuitable for development, such as wetlands, thereby discouraging development in hazardous areas. Local governments may also levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving beach erosion control, or flood and hurricane protection works within a designated area [NCGS 160A 238].

Spending

Counties and municipalities have been granted power to make expenditures in the public interest by the North Carolina General Assembly. An annual budget and a Capital Improvement Plan (CIP) can include hazard mitigation efforts. A CIP serves as a schedule for providing county or municipal services over a specified period of time. Committing to a timetable for the extension of facilities and services, local governments can effectively steer future growth and development and mitigate the impacts of natural hazards. The Town of Linden does prepare an annual budget, but does not have a CIP.

Fiscal Capability

The North Carolina General Assembly has empowered municipalities to make expenditures in the public interest [NCGS 160A 475]. The primary source for funding these expenditures comes from property taxes. These revenues generally finance critical services available and delivered on a daily basis. Examples of these services include: public utilities, solid waste management, emergency services, health and social services, and schools. The Town of Linden does not have available funds to support special projects such as hazard mitigation activities. Linden looks to the following sources for hazard mitigation funding:

Government Funding

Federal and State funds are available to local governments for the development and implementation of hazard mitigation plans. These sources are listed below.

Federal Funding

Hazard Mitigation Grant Program (HMGP) - This program provides funding for hazard mitigation measures following a Presidential disaster declaration. Even though the Federal government supplies the majority of the funds for this program, the program is administered on the State level. HMGP funds can be used for projects such as acquisition or relocation, retrofitting, development of local mitigation standards and comprehensive mitigation plans, structural hazard control and the purchase of equipment to improve preparedness and response.

Pre Disaster Mitigation Program Grants (PDM) - Pre Disaster Mitigation Program provides funding to States and local jurisdictions for cost-effective hazard mitigation actions. FEMA provides PDM grants to States, that in turn, provide sub-grants to local governments for mitigation activities such as planning and the implementation of projects identified through the evaluation of natural and man-made hazards.

Flood Mitigation Assistance Programs - This program (FMAP) furnishes mitigation assistance to States, local jurisdictions and individuals to reduce or eliminate the long-term risk of flood damage to the built environment and real property. FMAP is available on an annual basis and eligibility is based upon a jurisdiction participating in the National Flood Insurance Program and developing a mitigation plan. These funds may be used for elevation and/or dry flood proofing of structures, acquisition of real property, relocation or demolition of structures, as well as other minor structural projects.

National Flood Insurance Program - Participation in this risk-sharing program requires jurisdictions to adopt and enforce floodplain management ordinances designed to reduce future losses.

Buy-Out Programs - Funding is available to buy back floodplains, relocate residents, and demolish structures in order to eliminate or reduce payouts for recurring flood damage.

Earthquake Hazard Reduction Grants - These funds are available to States having a moderate or high risk of seismic activity.
Community Development Block Grants - The Community Development Block Grant (CDBG) is designed to assist counties and municipalities in rehabilitating substandard dwelling units and to expand economic opportunities, primarily for low-to-moderate income families. Additionally, as a result of a Presidential declared disaster, CDBG funds may be used for long-term needs such as acquisition, reconstruction, and redevelopment of disaster-affected areas.

Small Business Administration (SBA) Pre-Disaster Mitigation Loan Program - The purpose of this program is to make low-interest, fixed-rate loans to eligible small businesses for the purpose of implementing mitigation measures to protect business property from damage that may be caused by future disasters. The program is a pilot program, which supports the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Program.

Ability to Pay - The North Carolina Department of Commerce has ranked the 100 counties in an economic tier system due to the Lee Quality Jobs and Business Expansion Act of 1966, which provides for a sliding scale of State tax credits for economic investment. This Act has become North Carolina‘s primary development tool in an effort to assist smaller rural counties become economically competitive. The most economically depressed counties are ranked in Tier 1 and the most economically prosperous are ranked in Tier 5. These rankings are evaluated annually based on (1) population growth, (2) unemployment rate, and (3) per capita income

The tier ranking is widely used by the State as a measure of an individual county‘s ability to pay when applying for State and Federal grants. Cumberland County is ranked as a Tier 4 County.

Non-Government Funding

Another potential source of revenue for local mitigation efforts are the contribution of non-governmental organizations, such as churches, charities community relief funds, the American Red Cross, hospitals, for-profit businesses and non-profit organizations, such as nature conservancy and land trust organizations.

Technical Capability

The Town of Linden has limited resources for technical staff. The Town relies on the following technical sources:

State and Federal Technical Assistance

Agencies such as the Federal Emergency Management Agency (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. Additionally, they provide technical information on engineering principles, construction methods, costs and suggestions for how techniques can be financed and implemented. Federal agencies such the U.S. Army Corps of Engineers and Soil Conservation Service also provide similar services.

Statewide Floodplain Mapping Initiative

The State of North Carolina, through the Federal Emergency Management Agency's Cooperating Technical Community partnership initiative, has been designated as a Cooperating Technical State (CTS). As a CTS, the State will assume primary ownership and responsibility for Flood Insurance Rate Maps (FIRM) for all North Carolina communities. This project included conducting flood hazard analysis and producing updated digital FIRM maps.

The State has acquired raw elevation data for the six eastern river basins, Cape Fear, Lumber, Neuse, Pasquotank, Tar-Pamlico, and White Oak, which will be used to develop Digital Elevation Models (DEMs) update flood hazard data. The updated flood hazard data provides current, accurate information for local jurisdictions and property owners to make sound site planning and design decisions when building new structures and infrastructure and retrofitting existing structures.

Local Technical Assistance

Cumberland County has a geographic information system (GIS) that provides essential information and technology for hazard response and mitigation. The GIS system provides detailed data on property ownership, land use type and location, values of property and structures, location of the Special Flood Hazard Area and other infrastructure.

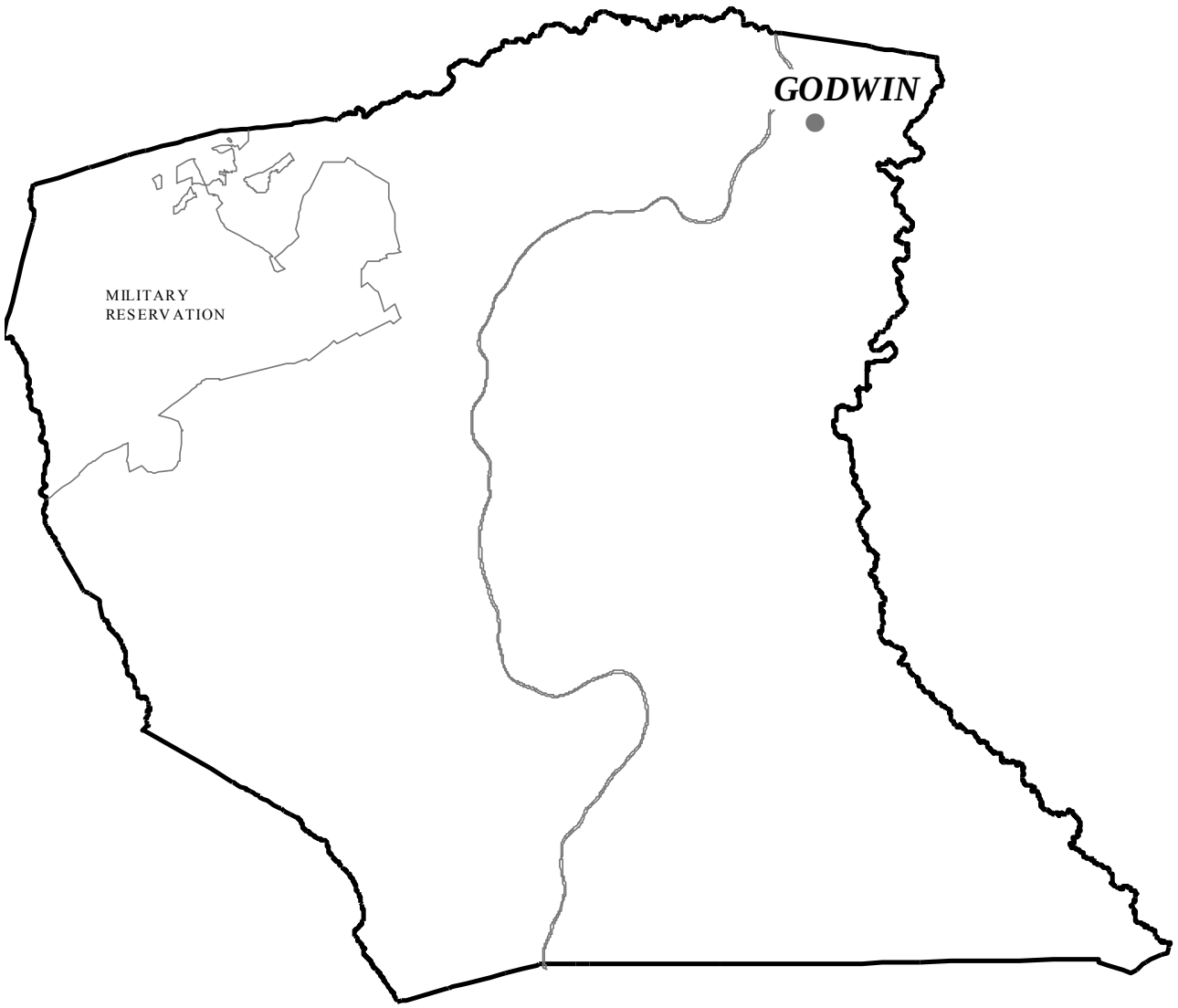
This system provides quick access and processing of detailed data that can be used to assist in deployment of resources, before, during and after a natural disaster, as well assists in planning for the mitigation of future disasters.

As previously mentioned in the Unincorporated Area Hazard Mitigation Plan Section entitled Local Departments, Agencies and Organizations, Linden has access to a responsive and highly trained staff who are capable of implementing mitigation strategies, as well as educating the public about potential hazards and the process necessary to mitigate these hazards.

Political Capability

The Linden Town Board of Commissioners is knowledgeable of the potential hazards faced by their respective jurisdictions, as well as past history of hazard events and recovery efforts. Additionally, the Cumberland County Joint Planning Board (serving Linden) is aware of the importance of hazard mitigation planning. Due to this knowledge and understanding, the current and future political climates are expected to be favorable for supporting hazard mitigation strategies.

TOWN OF GODWIN
HAZARD MITIGATION PLAN



TOWN OF GODWIN HAZARD MITIGATION PLAN

COMMUNITY PROFILE

Godwin is located in the northeastern portion of the County near the Harnett County line and is approximately .53 square miles in size. It is primarily a rural residential community with an estimated 2009 population of **180** persons, according to the North Carolina Office of Management and Budget. Significant Civilian employment categories include private industry, health care and social assistance, and retail trade. The Town is governed by a Mayor/Council form of government, having four commissioners and a mayor, and employs a Town Clerk.

IDENTIFYING AND PROFILING HAZARDS

For this update the Technical Committee reviewed **Table A1 – Hazard Identification and Analysis and Table A2 – Summary by Hazard Vulnerability by Jurisdiction**. The Technical Committee determined the following hazards still could affect Godwin: hurricane, drought, thunderstorms, severe winter storms, tornadoes, extreme heat, wildfires, and earthquakes. Additionally, the Technical Committee focused on localized flooding since it is associated with and caused by other types of hazards, such as thunderstorms, hurricanes and tornadoes. Godwin has experienced 8 hurricanes, 5 thunderstorms, 3 hailstorm, 15 winter storms, and 2 extreme heat events, and one drought during the period from January 1950 to June 2010 per NOAA history profile of Local Storm Events. It is highly likely that thunderstorms and extreme heat events will occur in the future. Additionally, it is likely that Godwin will experience hurricanes, tornadoes, droughts, wildfires, and severe winter storms. Localized flooding and earthquakes are possible. Wildfires, earthquakes, flooding and flash floods have not been documented within Godwin during this period. Detailed information on each hazard type and their profile are contained in Appendix A.

MITIGATION STRATEGIES

Town of Godwin has developed the following three (3) goals for the purposes of this Mitigation Plan. These goals serve as a basis for a more specific plan of action and are broad policy Statements aimed at guiding and directing future activity so that persons, property, government, and infrastructure are protected from the impacts of the natural hazards that affect Town of Godwin.

GOAL #1

Reduce vulnerability of Cumberland County and its municipalities to all natural hazards for existing development, future development, redevelopment and infrastructure.

GOAL #2

Identify and protect all properties/natural resources that are at risk of damage due to a hazard and to undertake cost-effective mitigation measures to minimize losses.

GOAL #3

Improve public awareness, education and outreach programs for the natural hazards that Cumberland County and its municipalities are most likely to experience.

Within the following pages, mitigation actions for the Town of Godwin are listed and will identify the following information for each action:

- Hazard targeted – *Hazard the action is targeted to mitigate.*
- Goals addressed – *Goal(s) the action will address.*
- Document reference – *Ordinance(s), Policies or Programs that the action references, if any.*
- Whether it would be a new policy or continuation or an amendment to an existing policy
- Priority – *Each action ranked in terms of overall importance (high, moderate or low). Priorities were based upon the following criteria: cost-benefit, hazard identification and profile, vulnerability and capability assessments, and mitigation goals.*
- Funding sources – *List of funding source or potential funding source*
- How the action will mitigate the hazard
- How the action will reduce overall vulnerability
- Will the action be:
  Cost effective – *Is a measure of how well the cost achieves the intended action.*
  Environmentally Sound – *Is a determination if technology exists within the financial means of the jurisdictions that can achieve an action.*
  Technically feasible *The action has minimal or no harm to nature or the environment.*
- On-going, Short-term or Long-term Implementation - *On-going actions are those that currently exist and should be continued. Short-term actions are those that can be implemented within existing resources and should be accomplished within a time frame of six (6) months to two (2) years. Long-term actions will take additional resources or authorities and should be organized to begin implementation within a time frame of 3-5 years.*
- Person(s) or department responsible for the action – *Person(s) or Department(s) responsible for implementing the action.*
- Benchmark and indicator of progress – *Explains what needs to be accomplishment to meet this action.*
- Update – *Explains what has or has not been done to this action.*

The Hazard Mitigation Technical Committee looked at all the actions from the original Plan and the Updated Plan and considered the jurisdiction‘s cost of the action to be taken and their cost if no action is taken. In most cases it was determined that it was far less costly for the jurisdictions to take preventive action whenever possible than wait until a hazard occurred, therefore most of the actions taken are more preventive in nature. Most of the jurisdictions have limited financial resources to establish capital projects that address existing facilities vulnerable to the various hazards, such as relocating, removing, purchasing vulnerable properties; providing public water, or placing electrical lines underground. The Hazard Mitigation Technical Committee determined that flooding was the most likely hazard to occur based on past records. Most of the past damage occurred on properties located in the Special Flood Hazard Area. Many of these properties are aged and through attrition and general decay will eventually be removed from the hazardous area. Preventive measures will keep new structures from being built in these areas.

ACTION 1: ***Develop Uniform Flood Damage Prevention Ordinance.***

Hazard Targeted	Flood
Goals Addressed	1
Document Reference, if applicable	Cumberland County, Fayetteville, Hope Mills and Spring Lake Flood Damage Prevention Ordinances
New, Continuation, Amendment	Deletion of this action.
Priority	Medium
Funding	Not applicable

How the Action Will:

Mitigate the Hazard	Reduce the impact of new developments within special flood areas, thus reducing the amount of losses during a hazard event and maintains compliance with NFIP.
Reduce Overall Vulnerability	Limiting new development within the flood hazard areas would reduce the losses during a hazard event.

Will the Action Be:

Cost Effective	Yes
Environmentally Sound	Yes
Technically Feasible	Yes

On-going, Short-term, Long-term Implementation	Long-term
Person(s) or Department Responsible	Cumberland County Engineering Department
Benchmark and Indicator Of Progress	The Town of Godwin adopted the Revised Cumberland County Flood Damage Prevention Ordinance and the new FIRM on October 16, 2006. The new digital firm map adopted by the Town indicates there is no Special Flood Hazard Area within its Town Limits. Also continues compliance with NFIP. See Unincorporated Area Action #6 for further explanation for the deletion of this action.

ACTION 2: ***Revise Subdivision Ordinance To Require That All Utilities Be Placed Underground With The Exception Of High Voltage Electrical Transmission Lines.***

Hazard Targeted	Multi-hazard (Flooding, Hurricanes, Tornadoes, Thunderstorms and Winter Storms)
Goals Addressed	1; 2
Document Reference, if applicable	Town of Godwin Subdivision Ordinance
New, Continuation, Amendment	Completed
Priority	Medium
Funding	Not Applicable

How the Action Will:

Mitigate the Hazard	Reduce the overall impact of lost utility services and protect the public health, safety, and welfare.
Reduce Overall Vulnerability	Reduce damage cost, loss of service, and eliminate life-threatening situations to citizens and utility companies.

Will the Action Be:

Cost Effective	Yes
Environmentally Sound	Yes
Technically Feasible	Yes

On-going, Short-term, Long-term Implementation	Short-term
Person(s) or Department Responsible	Cumberland County Planning Department and Electrical Providers
Benchmark and Indicator Of Progress	Currently, Godwin's Subdivision Ordinance requires ~~a~~all development shall have utilities placed underground where practical". Mapping of underground electrical utilities is the responsibility of electrical providers.

ACTION 3: ***Develop A Program To Ensure Drainage Ways, Culverts And Storm Drains Are Free Of Debris.***

Hazard Targeted	Flood
Goals Addressed	1; 2
Document Reference, if applicable	
New, Continuation, Amendment	Completed
Priority	High
Funding	Stormwater Fund

How the Action Will:

Mitigate the Hazard	Regular maintenance of debris from drainage ways, culverts and storm drains would provide the proper flow of water and reduce flooding.
Reduce Overall Vulnerability	Reduce vulnerability of flooding to streets, structures, and land located along drainage ways, culverts and storm drains.

Will the Action Be:

Cost Effective	Yes
Environmentally Sound	Yes
Technically Feasible	Yes

On-going, Short-term, Long-term Implementation	Long-term
Person(s) or Department Responsible	Cumberland County Engineering Department
Benchmark and Indicator Of Progress	The Town of Godwin ensures that the drainageways, culverts and storm drains are free of debris on Town streets and property. The NC Department of Transportation maintains streets that are a part of the State Road system.

ACTION 4: ***Develop A Landscape Ordinance That Will Encourage Protection To Natural Areas Through Design And Provide More Vegetation In Urban Development.***

Hazard Targeted	Flood, Extreme Heat
Goals Addressed	1; 2
Document Reference, if applicable	Cumberland County Zoning Ordinance
New, Continuation, Amendment	Completed on June 20, 2005
Priority	Moderate
Funding	Not applicable

How the Action Will:

Mitigate the Hazard	Provide more pervious area for natural drainage and provide reduction in extreme heat.
Reduce Overall Vulnerability	Reduce the vulnerability to localized flooding and extreme heat.

Will the Action Be:

Cost Effective	Yes
Environmentally Sound	Yes
Technically Feasible	Yes

On-going, Short-term, Long-term Implementation	Long-term
Person(s) or Department Responsible	Cumberland County Planning Department
Benchmark and Indicator Of Progress	Landscaping requirement included in the Cumberland County Zoning Ordinance that is applicable in the Town of Godwin. These landscaping requirements apply to non-residential and mixed use developments adopted June 20, 2005.

ACTION 5: ***Identify Areas That Are Susceptible To Wildfires And Consider Prescribed Fire (Controlled Burning) Management Tool To Reduce The Impact Of Wildfire Hazards.***

Hazard Targeted	Wildfires
Goals Addressed	1; 2
Document Reference, if applicable	Not applicable
New, Continuation, Amendment	Deferred
Priority	High
Funding	Not applicable

How the Action Will:

Mitigate the Hazard	Provide a mechanism to limit the amount of damage to those areas susceptible to wildfires. This is very important to the small rural municipalities because most of the land surrounding the Towns is undeveloped, woodlands, and farmland.
Reduce Overall Vulnerability	Reduce the amount of woodland that is lost to wildfires.

Will the Action Be:

Cost Effective	Yes
Environmentally Sound	Yes
Technically Feasible	Yes

On-going, Short-term, Long-term Implementation	Long-term
Person(s) or Department Responsible	NC Forest Service
Benchmark and Indicator Of Progress	Currently the Cumberland County office of Forest Service has developed a draft risk assessment of those areas of Cumberland County (including Town of Godwin) that are susceptible to wildfires. This risk assessment is general in nature and for in office use only. The NC Forest Service has completed five Community Wildfire Protection Plans for certain areas of Cumberland County.

IMPLEMENTATION

Plan implementation will start from the time that it is adopted. The Mayor of Godwin will be responsible for pursuing the development of policies, programs, ordinances, amendments, and regulations as they are assigned by the actions listed above. The Cumberland County Joint Planning Board staff will prepare these planning documents, ensuring that the goals, objectives and strategies of these documents will be consistent with the Updated Hazard Mitigation Plan and would not increase the hazard vulnerability or decrease hazard capability of Godwin. The Cumberland County Joint Planning Board (also serving on the Cumberland County Hazard Mitigation Steering Committee) would receive all planning documents for review and approval. Their comments are forwarded to the Godwin Board of Commissioners for review and adoption. The public will be given the opportunity to provide input at public hearings before these entities. It will be the responsibility of the Mayor to ensure that these actions are carried out within the allotted time frame.

MONITORING, EVALUATING, AND REPORTING PROGRESS

Periodic monitoring and reporting of the Godwin Area Hazard Mitigation Plan of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update is required to ensure that the goals and objectives for Town of Godwin are kept current and that local mitigation efforts are being carried out. The monitoring and reporting is to supplement the Plan within the five-year cycle. The Cumberland County Emergency Services Department will act as the contact and clearing house for relevant information.

The Plan shall be reviewed annually, unless a situation occurs making it necessary to review sooner (e.g. natural disasters, new FEMA maps—see Revisions and Updates). Town of Godwin shall request that the Cumberland County Joint Planning Board include this annual review in the Board‘s Work Program. The review will be coordinated with The Cumberland County Emergency Management Department. Then the report will be forwarded to the Godwin Board of Commissioners for review and adoption. The public will have the opportunity to provide input on the Plan at public hearings held before the Cumberland County Joint Planning Board and the Godwin Board of Commissioners.

The annual report will include the following:

1. An evaluation of the effectiveness and appropriateness of the mitigation actions proposed in the Plan.
2. A list of problems that have occurred in the implementation process.
3. Changes in Godwin‘s priorities.
4. Recommendations for changes, revisions, or amendments to the Plan.

The following questions will be helpful to the Town of Godwin in assessing their Updated Hazard Mitigation Plan: (1) Do the goals and objectives address current and expected conditions; (2) Has the nature or magnitude of risks changed; (3) Are the current resources appropriate for implementing the Plan; (4) Are there implementation problems, such as technical, political, legal or coordination issues with other agencies/departments; (5) Have the outcomes occurred as expected; and (6) Did the agencies/departments and other partners participate in the Plan and planning process as proposed.

REVISIONS AND UPDATES

As updates occur, the date, reason and responsible party should be noted. Updates or revisions, which affect the Plan as a whole and impact any other jurisdiction(s) will require the approval of the jurisdiction(s) governing body.

At the end of every five-year cycle, the Hazard Mitigation Technical Committee will submit the hazard profile, vulnerability assessment and local capability assessment updates or revisions to FEMA and NCDEM for review. Increased development, increased exposure to certain hazards, the development of new mitigation capabilities or techniques and changes to Federal or State legislation are examples of changes that may affect the condition of the Plan. The updated Plan will be reviewed by the Cumberland County Joint Planning Board and its recommendation forwarded to the Godwin Board of Commissioners for consideration and adoption. Copies of any revision, amendment or update to the Plan must be filed with the Godwin Town Clerk and Cumberland County Emergency Services Department and added to the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update and will be available to the public for review.

Resolution

WHEREAS, the Town of Godwin desires to remain eligible for the State and Federal disaster relief funds in the event of a declared disaster in the Town; and

WHEREAS, the Godwin Board of Commission recognizes the value of having a Plan in place for identifying, prioritizing, and mitigating potential and real hazards that could affect the Town of Godwin; and

WHEREAS, Cumberland County Joint Planning Board Staff prepared the Updated Godwin Hazard Mitigation Plan as part of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update and has revised the Plan as suggested by the North Carolina Division of Emergency Management after its submittal to all appropriate government entities for review and comments; and

WHEREAS, the North Carolina Division of Emergency Management has endorsed the Godwin Hazard Mitigation Plan as part of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update; and

NOW, THEREFORE, BE IT RESOLVED by Godwin Board of Commissioners that it adopts the Godwin Hazard Mitigation Plan as part of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update ; and

BE IT FURTHER RESOLVED that the Godwin Board of Commissioners resolve to annually review the Plan and make revisions to all sections regarding the Town of Godwin in the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update when new data and information becomes available, as mitigation measures are achieved, and as mitigation strategies evolve; and

FURTHER, that the Town of Godwin may update and revise the Godwin Hazard Mitigation Plan as part of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update as it relates to the Town but does not affect any other jurisdiction(s). If any revision, update or amendment that involves another jurisdiction, the updates and revisions must be approved by the governing body of the affected jurisdiction(s). Copies of any revision, amendment or update to the Plan by the Town of Godwin must be filed with the Town Clerk and sent to the Cumberland County Emergency Services Department, and added to the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update; and

FURTHER, that administrative changes, wording corrections, the hazard analysis, and vulnerability assessment or other such portions of the Updated Godwin Hazard Mitigation Plan part of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update, do not require additional action by the Godwin Board of the Commissioners.

Adopted 19th day of September, 2011

Attest:

Mark Royal
Board of Commissioner, Godwin

Deborah L. Godwin
Mayor, Town of Godwin

VULNERABILITY ASSESSMENT

The assessment of the vulnerability of the population and facilities in the Town of Godwin examined the type and location of development, the infrastructure, and public buildings. Godwin has experienced some of the same hazard events as the overall County (see Vulnerability Assessment of the overall County Section and Identifying and Profiling Hazards above). The types of hazards and the areas they impact, relative to the Town of Godwin, are delineated in **Table A1 - Hazard Identification and Analysis** and **Table A2 - Summary of Hazard Vulnerability by Jurisdiction** located in Appendix A - Hazard Profile.

Current Conditions

Information compiled for the Town of Godwin through GIS, tax records, existing studies, zoning and subdivision regulations, records, and data from other Federal, State and local agencies shows vulnerable facilities and special populations. Current conditions of this development and facilities are as shown in **Table 49 - Godwin Private Building Vulnerability Assessment** and on **Map 40 - Godwin Critical Facilities Location**. This table shows there are 55 single-family residential structures with a value of $11,597,684 impacting 143 persons, and two commercial structures with a value of $512,776 affecting 8 persons; four other buildings valued at $1,855,594 impacting three persons are subject to the natural hazards outlined above. In summary, there are 61 structures valued at $13,966,054 impacting 154 persons being subject to natural disasters in the Town of Godwin.

The critical facilities identified are listed in Appendix B - Critical Facilities Ranking. Critical facilities impacted in Godwin are 17,372 feet of streets valued at $3,283,308; 47,524 feet of sewer lines valued at $7,128,600; 15,666 feet of water lines valued at $1,409,940; and one government office building valued at $433,656 affecting two persons with a combined value of $8,184,478 as shown in **Table 50 - Godwin Public Buildings and Critical Facilities Vulnerability Assessment Data**. Summary data in this table shows that there are currently a total of 62 buildings and infrastructure valued at $26,221,558 impacting 156 persons.

There is no designated special flood hazard area in the Town based on the updated FIRMS. The topography in the Town is basically flat and there are no major streams. The Cape Fear River is located approximately one mile to the west and has no impact on development in Godwin. The Town of Godwin has participated in the National Flood Insurance Program since October 3, 2000.

Vulnerable Populations

Vulnerable population data was taken from the profile of General Demographic Characteristics of Godwin in the 2000 Census. Vulnerable population was defined as the elderly (75 years of age and older), institutionalized, disabled persons, persons with a language barrier, persons below the poverty level, persons without a vehicle or telephone in their home, those living in certain manufactured (mobile) homes, and renters.

Current data shows that the Town of Godwin has 6 persons over 75 years old and zero institutionalized. Census data shows that there are 12 disabled persons and 3 individuals with a language barrier in the Town. Only 3 families are listed as below the poverty level. There are zero families in the Town without a vehicle and two families without telephone access. Approximately 10 families live in mobile homes and 6 families live in rental units.

Development Trends and Projections

Development trends that may impact hazard mitigation include the direction of growth, current zoning and future land use. The Town is a partner with NORCRESS in the provision of sewer service to northeastern Cumberland County. The Town provides public water service to its resident with a source from the City of Dunn. The completion of the Fayetteville Outer Loop will impact the Town by providing quick access into the Fayetteville metro area as well as to the Military Reservation.

Godwin's zoning districts include agricultural, suburban, and medium density residential (suburban - two or less units per acre and medium - greater than six but less than 15 units per acre), office and institutional and commercial districts as shown on **Map 41 - Godwin Zoning Map**. Data shows that approximately 129 acres are zoned agricultural (A1), 134 acres are zoned suburban density residential (R40, R40A and RR), 63 acres of medium density residential (R6A), 1.3 acres office and institutional (O&IP) and 10 acres of commercial (C1 and C3).

The proposed land use for Godwin is shown on **Map 42 - Godwin Land Use Plan Map**. This map indicates the community's vision for the future use of land. According to the Plan approximately 121 acres suburban density residential, 83 acres are designated as low density residential, 62 acres for medium density residential, and 70 acres of commercial.

Projections for private buildings in Godwin for 2025 shows that there will be 67 single family dwellings, valued at $14,068,855 impacting 173 persons; and two commercial buildings valued at $622,036 impacting 10 persons; five other buildings valued at $2,250,974 impacting four persons as shown in Table 49 Godwin Private Buildings Vulnerability Assessment. In summary, the number of projected private buildings in Godwin subject to a natural hazard in 2025 is 74 buildings with an estimated value of $16,941,864 impacting 187 persons. The 2025 projected data for Godwin is shown in Table 50 Godwin Public Buildings and Critical Facilities Vulnerability Assessment show 21,074 feet of roads valued at $3,982,897; 19,004 feet of water lines valued at $1,710,362; 57,650 feet of sewer valued at $8,647,523; and one government office valued at $526,057 impacting two persons. In summary, the 2025 projections shows 75 buildings and infrastructure valued at $31,808,704 impacting 189 persons. (See Appendix C-Methodology for projection method)

Table 49 - Godwin Private Buildings Vulnerability Assessment

Hazard Type(s): Hurricane, Drought, Thunderstorms, Severe Winter Storms, Tornadoes, Extreme Heat, Wildfires, and Earthquakes

Current Conditions				Potential Future Conditions (Projection Year 2025)		
Type of Development	**Number of Existing Private Buildings**	*** Current Value**	**Current Number of People**	**Projected Number of Private Buildings**	**Projected Value**	**Projected Number of People**
Single-Family Residential	55	$11,597,684	143	67	$14,068,855	173
Multi-Family Residential	0	$ 0	0	0	$0	0
Commercial	2	$512,776	8	2	$622,036	10
Industrial	0	$0	0	0	$0	0
Other	4	$1,855,594	3	5	$2,250,974	4
Subtotal	**61**	**$13,966,054**	**154**	**74**	**$16,941,864**	**187**

* Values and building counts from County GIS - January 2010
The methodology used in preparing this data is described in Appendix C.

Table 50 - Godwin Public Buildings and Critical Facilities Vulnerability Assessment

Hazard Type(s): Hurricane, Localized Flooding, Drought, Thunderstorms, Severe Winter Storms, Tornadoes, Extreme Heat, Wildfires, and Earthquakes

Current Conditions				Potential Future Conditions (Projection Year 2025)		
Type of Development	**Number of Existing Public Buildings & Critical Facilities**	*** Current Value**	**Current Number of People**	**Projected Number of Public Buildings**	**Projected Value**	**Projected Number of People**
Sewage Treatment Plants	0	$ 0	0	0	0	0
Water Treatment Plants	0	$ 0	0	0	0	0
Hospitals/Rest Homes	0	$ 0	0	0	0	0
Schools	0	$0		0	0	0
Infrastructure (streets, bridges, drainage, etc.)	Water lines - 15,666‘ Streets - 17,372‘ Sewer Lines – 47,524	$1,409,940 $3,283,308 $7,128,600	N/A	Water Lines - 19,004‘ Roads - 21,074‘ Sewer Lines - 57,650‘	$1,710,362 $3,982,897 $8,647,523	N/A
Police Stations	0	$ 0	0	0	0	0
Fire Stations	0	$ 0	0	0	0	0
Hazard Materials Facilities		$ 0	0	0	0	0
Government offices	1	$ 433,656	2	1	$526,057	2
Emergency Shelters	0	$ 0	0	0	0	0
Public Housing	0	$ 0	0	0	0	0
Subtotal	**Buildings - 1 & Infrastructure**	**$433,656 $11,821,848**	**2**	**Buildings - 1 & Infrastructure**	**$526,057 $14,340,783**	**2**
TOTAL:	**Buildings - 62 & Infrastructure**	**$26,221,558**	**156**	**Buildings - 75 & Infrastructure**	**$31,808,704**	**189**

* Values and building counts from County GIS - January 2010
The methodology used in preparing this data is described in Appendix C.

Map 40

Town of Godwin Critical Facilities

MAIN ST
ROYAL ST
DUNN RD
MARKHAM ST
POPE ST
EDGERTON ST
DEAN ST
LUCAS ST
MCLEAN ST
GIN ST
GODWIN-FALCON RD
LEITHA
Godwin

Legend

- Bridge
- Municipal Boundary
- Streams-Rivers
- Lakes

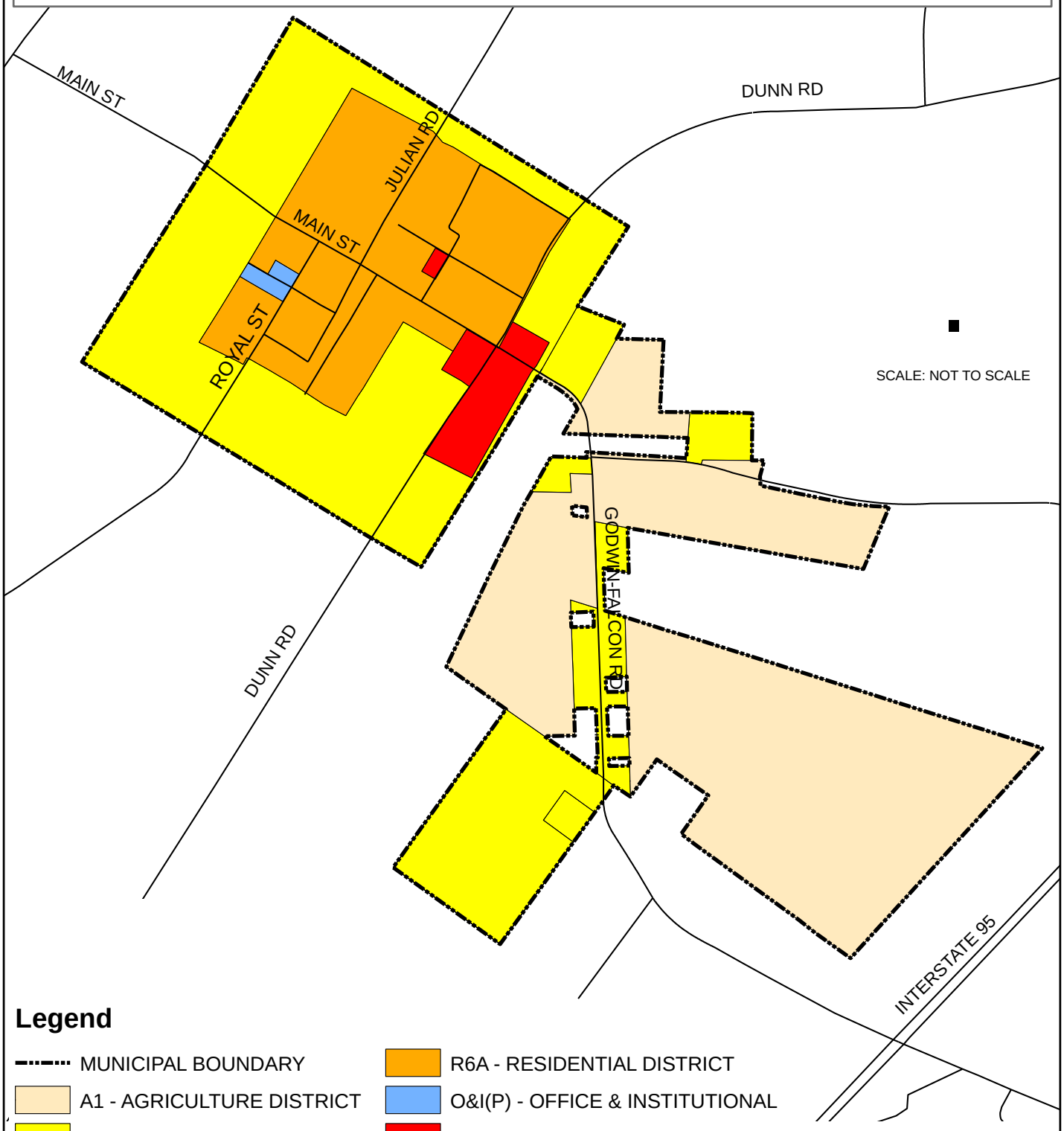
N

0 0.125 0.25

miles

MAP 41

TOWN OF GODWIN ZONING



Legend

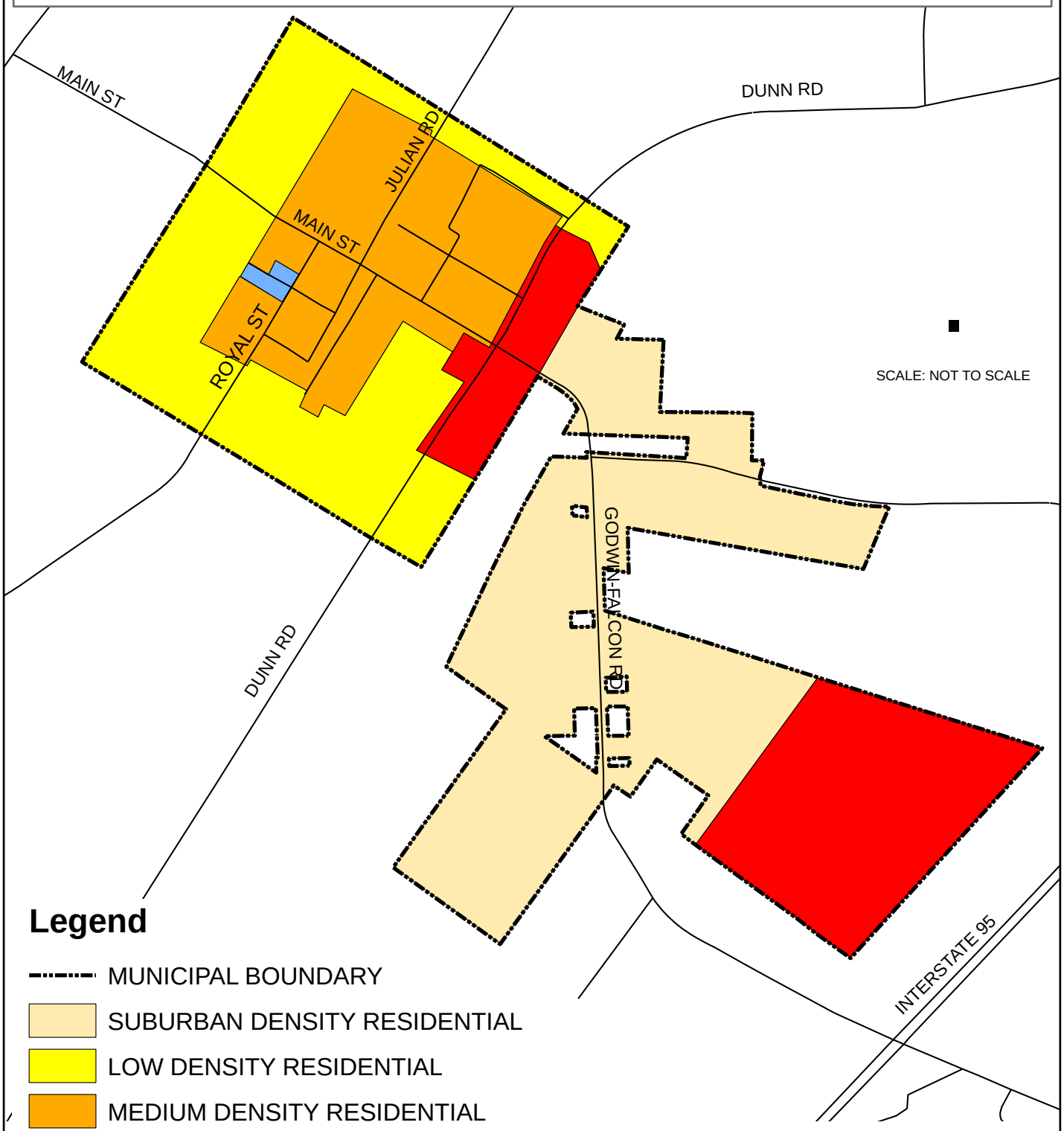
- MUNICIPAL BOUNDARY
- A1 - AGRICULTURE DISTRICT
- R40 - RESIDENTIAL DISTRICT
- R40A - RESIDENTIAL DISTRICT
- RR - RESIDENTIAL DISTRICT
- R6A - RESIDENTIAL DISTRICT
- O&I(P) - OFFICE & INSTITUTIONAL
- C3 - COMMERCIAL DISTRICT
- C1(P) - COMMERCIAL DISTRICT

NOTE: ALL OF THE TOWN OF GODWIN IS DESINGNATED FOR THE FOLLOWING HAZARDS: HURRICANES, TORNADOES, THUNDERSTORMS, DROUGHTS, SEVERE WINTER STORMS, EXTREME HEAT, WILDFIRES AND EARTHQUAKES.

Cumberland County Multi-Jurisdictional HAZARD MITIGATION PLAN UPDATE

MAP 42

TOWN OF GODWIN LAND USE PLAN



Legend

- MUNICIPAL BOUNDARY
- SUBURBAN DENSITY RESIDENTIAL
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- OFFICE & INSTITUTIONAL
- COMMERCIAL

NOTE: ALL OF THE TOWN OF GODWIN IS DESINGNATED FOR THE FOLLOWING HAZARDS: HURRICANES, TORNADOES, THUNDERSTORMS, DROUGHTS, SEVERE WINTER STORMS, EXTREME HEAT, WILDFIRES AND EARTHQUAKES.

Cumberland County Multi-Jurisdictional HAZARD MITIGATION PLAN UPDATE

CAPABILITY ASSESSMENT

Local Departments, Agencies and Organizations

The Town of Godwin operates under the Mayor/Council form of government and employs a Town Clerk. The Town provides administrative services, maintenance of the water system and reading of the water meters. The following County Departments provide services to Town residents: Cumberland County Sheriff Department, Fire Station #17 Godwin-Falcon Volunteer Fire Department and Cumberland County EMS provide police and fire protection and emergency services; Cumberland County Animal Control, Health, Mental Health, Social Services, and Solid Waste Departments provide public health and human services; Cumberland County Planning and Inspections provides planning services and enforcement of the Godwin Zoning and Subdivision Ordinances and State Building Code; County Engineering administers the Flood Damage Prevention Ordinance; Public Utilities Department administers the NORCRESS Sanitary District (Godwin is a member); and the County Tax Administration Department collects applicable taxes, fees and assessments for the Town. There are numerous State and Local Agencies and Organizations that provide services relevant to hazard mitigation for Godwin residents. A complete list was presented within the Cumberland County Capability Assessment above.

Policy and Program Capability

This section includes the identification and evaluation of existing ordinances, policies, and programs that are relevant to the community's vulnerability to natural hazards. This inventory consists of specific mitigation initiatives, their effectiveness and strategies to improve mitigation effectiveness. Additionally, this information is contained within **Table 51 - Godwin Inventory of Local Ordinances, Policies and Programs Relevant to Hazard Mitigation**.

Most of the actions in the original Mitigation Plan that require ordinance revisions or policy changes have been completed and/or adopted. The Planning Staff currently has an ongoing process of rewriting, updating (zoning and subdivisions) and creating new ordinances for several of the local jurisdictions, including Town of Godwin. These ordinances already comply with many of the mitigation actions that the Town has already endorsed. Those actions that have not been completed are more developer resistance and cost prohibit. The Technical Committee will continue educating citizens, elected officials and the development community concerning our mitigation efforts and actions.

Godwin Subdivision Ordinance - The Town of Godwin Subdivision Ordinance contains several sections that are relevant to hazard mitigation. These sections address specific design standards that mitigate hazards such as: flooding and stormwater detention/retention.

Godwin Zoning Ordinance - The Town of Godwin adopted the Cumberland County Zoning Ordinance. This ordinance addresses hazard mitigation by protecting identifiable natural resources from urban encroachment by establishing the CD Conservancy District that allows a limited number of allowable land uses.

Flood Damage Prevention Ordinance - Cumberland County has developed and adopted a Flood Damage Prevention Ordinance designed to minimize the public and private losses due to flood conditions in specific areas and to protect the public health, safety and welfare. The Town of Godwin adopted this ordinance, which establishes the requirements for elevation and flood proofing (non-residential) to base flood elevation and a development permit.

National Flood Insurance Program and Community Rating System - The National Flood Insurance Program (NFIP) provides flood insurance to individuals in local jurisdictions that are members of the program. Membership in the Program is based upon the adoption and enforcement of floodplain management and development regulations. Even though the Town of Godwin does not have any

designated Special Flood Hazard Area within the Town, they approved the participation in the National Flood Insurance Program. Compliance of the NFIP for the Unincorporated Area, Eastover, Falcon, Godwin, Linden, Stedman and Wade is responsibility of the Cumberland County Engineering Department. They maintain the Cumberland County flood maps and Flood Damage Prevention Ordinance and issue Floodplain Development Permits for those jurisdictions in accordance with compliance of NFIP. An element of the NFIP is the Community Rating System (CRS), which adjusts flood insurance premiums relative to a local jurisdiction's investment in flood damage mitigation. Inclusion in the CRS involves submitting a local jurisdiction's floodplain management procedures for evaluation.

NCDOT Subdivision Roads Minimum Construction Standards - The North Carolina Department of Transportation has established minimum construction standards for new subdivision roads (to be dedicated as public or private). According to North Carolina General Statutes, all new subdivision roads connecting to the State system must obtain a construction permit from a Division of Highways District Engineer and must meet these construction standards. Standards relevant to hazard mitigation include: surface and subsurface drainage, bridges, roadway dams, and specifications for design and construction to accommodate emergency vehicles.

2030 Cumberland County Growth Vision Plan Policies, Actions, and Map
Cumberland County, along with all the municipalities in the County adopted this land use plan which serves as a guide for development. This Plan contains several recommendations relevant to hazard mitigation. The Plan recommends the provision of open space/environmental corridors along rivers and major water features, which reduces the amount of development within and adjacent to the floodplain and protects the natural riparian cover adjacent to these water features. Recommendations also include using environmental corridors as a network of greenways connecting recreation and school facilities with natural areas. The Plan recommends all development activity within the Special Flood Hazard Area be limited to low intensity uses. Development standards are also recommended to reduce the amount of impervious surfaces and to protect existing natural features. A general Land Use Plan Map was also adopted, which provides a guide for orderly growth and development. The Plan applies to all of the jurisdictions within the County including Godwin.

Cumberland County Land Use Policies Plan
Godwin, along with all the municipalities in the Cumberland County and Cumberland County have developed and adopted a land use policies plan which serves as a guide for development. This Plan contains location criteria for development relevant to hazard mitigation by limiting the type and intensity of development within the Special Flood Hazard Area.

Northeast Vision Plan
This Plan was a detailed land use plan that included the northeastern portion of Cumberland County which includes the Town of Godwin. Its objective was to develop a plan that respects the character of the Area, accommodates the anticipated growth; preserves and protects the natural features, historic and scenic sites, rural farm stead, and farmland; maintain the uniqueness of the Towns in the Area and create opportunities for the provision of public and commercial services to enhance the quality of life in the Area.

2000 International Building Code with North Carolina Amendments - This Code provides specific standards for plumbing, building, mechanical and electrical construction, mandated by the State of North Carolina. This Code is under the jurisdiction of the North Carolina Department of Insurance and is enforced locally by the Cumberland County Planning and Inspections Department.

N.C. General Statutes 113A Article 4 Sedimentation Pollution control Act - This Act provides a mechanism to protect existing natural resources and the public health, safety and welfare through

sedimentation and erosion control. The State of North Carolina administers permitting and enforcement measures for Cumberland County and the municipalities therein.

Mid-Carolina Rural Planning Organization - The Mid-Carolina Rural Planning Organization provides detailed planning and classifications for the road network within the Rural Planning Area in order to provide adequate traffic movement. Classifications and design specifications are assigned to roads in order to ensure adequate right-of-way and design as transportation improvements are initiated.

Cumberland County Emergency Operations Plan - Cumberland County prepared and adopted this Plan in order to reduce the vulnerability of people and property to a disaster and to provide an effective means of response in the event of a disaster. This Plan also includes an inventory of critical facilities that would be impacted during a disaster.

Sandhills Area Land Trust- The Sandhills Area Land Trust is a non-profit organization working with citizens, developers, local government, and landowners to preserve the natural resources and environment within the Sandhills. This organization is working with Cumberland County, as well as 6 other counties, to accept donations of land, arranges leases to protect special land holdings and works to negotiate conservation easements.

Cape Fear River Assembly - The Cape Fear River Assembly has a membership of approximately 400 and a 34-member Board of Directors representing 29 counties within the Cape Fear River Basin. The purpose of the Assembly is to provide the highest quality of life for residents within the Cape Fear River Basin through proper management of the Cape Fear River, its tributaries and adjacent land uses.

Sustainable Sandhills - This initiative, comprised of members of communities within 6 counties bordering Fort Bragg and Camp Mackall and the Military, is working to provide a model for regional sustainability planning. Sustainability planning focuses on balancing preservation of natural resources, economic development strategies, development, and Military operations. Cumberland County is represented within this initiative.

Joint Compatible Land Use Study 2003 - The purpose of this Study is to provide policies and implementation measures to mitigate conflicts between urban development and Military operations at Fort Bragg, Pope Air Force Base and Camp Mackall. Cumberland County is included within this Study.

Table 51 - Godwin Inventory of Local Ordinances, Policies, and Programs Relevant to Hazard Mitigation

TITLE & ADOPTION DATE	DOCUMENT REFERENCE	PURPOSE & DESCRIPTION	MITIGATION EFFECTIVENESS	RATIONALE FOR EFFECTIVENESS	MITIGATION STRATEGY
Town of Godwin Subdivision Ordinance 6/16/98	Section 3.11	To provide for existing or future drainage needed to protect public health, safety, and welfare.	MODERATE	This Ordinance establishes minimum development standards.	Establish detailed development standards.
Town of Godwin Subdivision Ordinance 6/16/98	Section 3.13.1(b)	To provide standards for park, recreation, open space areas to protect public health, safety, and welfare.	HIGH	This Ordinance provides specific design standards that address stormwater detention/retention facilities, landscape buffers and the 100-year flood elevation.	
Town of Godwin Subdivision Ordinance 6/16/98	Section 3.16	To provide standards for lots located within areas of special flood hazard.	MODERATE	This Ordinance provides specific standards that address lots subject to flooding.	Amend to require additional entrance into development s, especially in special hazard areas, for rescue vehicle and evacuation routes.
Town of Godwin Subdivision Ordinance 6/16/98	Section 3.17	To provide standards for street design needed to protect the public health, safety, and welfare.	HIGH	This Ordinance provides specific standards that address street design to accommodate fire and rescue vehicles.	
Town of Godwin Subdivision Ordinance 6/16/98	Section 3.21	To provide standards for adequate physical separation of buildings to protect the public health, safety, and welfare.	HIGH	This Ordinance provides specific standards that address building separation.	
Town of Godwin Subdivision Ordinance 6/16/98	Section 3.23	To provide standards for the location and design of mobile home parks needed to protect the public health, safety, and welfare.	HIGH	This Ordinance does not allow mobile home parks to be located within floodplain areas and has standards that address drainage. Additionally this ordinance addresses physical separation between units, density, drainage and fire protection standards.	

TITLE & ADOPTION DATE	DOCUMENT REFERENCE	PURPOSE & DESCRIPTION	MITIGATION EFFECTIVENESS	RATIONALE FOR EFFECTIVENESS	MITIGATION STRATEGY
Town of Godwin Subdivision Ordinance 6/16/98	Article IV Table I Minimum Development Standards for Urban, Suburban and Rural Densities	To provide a development standard recommending underground utilities (except for high voltage electrical lines) and fire hydrants.	HIGH	This Ordinance provides specific development standards that would reduce the impact of weather related disasters upon utilities and provide fire protection capabilities.	
Town of Godwin Subdivision Ordinance 6/16/98	Section 4.1	To provide standards for the construction of streets within a subdivision.	HIGH	This Ordinance provides specific standards that address drainage relevant to streets.	
Town of Godwin Subdivision Ordinance 6/16/98	Section 4.3	To provide standards for the construction of or improvements within a subdivision.	MODERATE	This Ordinance provides specific standards that address drainage during construction or improvements within a subdivision, underground utilities and installation of fire hydrants.	Amend to include standards to reduce the amount of impervious surfaces within a subdivision.
Town of Godwin adopted the Cumberland County Zoning Ordinance Revised 5/26/96	Section 3.1	To preserve and protect identifiable natural resources from urban encroachment by establishing a limited number of allowable land uses.	HIGH	This Ordinance provides a specific list of permitted uses allowed within the CD Conservancy District. Additionally, the ordinance provides a list of specified conditional uses that may be approved by the Board of Adjustment.	
Town of Godwin adopted the Cumberland County Zoning Ordinance Revised 5/26/96	Section 7.26, 7.3 and Section 7.31	To provide adequate separation of structures in order to protect the public water quality as well as public health, safety, and welfare.	HIGH	This Ordinance requires separate yard space for buildings, zoning district dimensional requirements and physical separation of mobile homes within a mobile home park.	

TITLE & ADOPTION DATE	DOCUMENT REFERENCE	PURPOSE & DESCRIPTION	MITIGATION EFFECTIVENESS	RATIONALE FOR EFFECTIVENESS	MITIGATION STRATEGY
Flood Damage Prevention Ordinance 5/1/00		To minimize the public and private losses due to flood conditions in specific areas and to protect the public health, safety, and welfare.	HIGH	This Ordinance outlines general standards required in all special flood hazard areas and specific development standards required in all special flood hazard areas where base flood elevation data has been provided. A floodplain development permit is required.	
National Flood Insurance Program 10/3/00		To provide flood insurance for individuals within jurisdictions having membership in the program. Membership is based upon having floodplain management and development regulations. Compliance to the NFIP is the responsibility of the Cumberland County Engineering Department.	HIGH	Member	
NCDOT Subdivision Roads Minimum Construction Standards 7/1/85	Minimum Design and Construction Criteria Section	To provide standards for the design, construction and maintenance of subdivision roads in order to protect the public health, safety, and welfare.	HIGH	This manual outlines specific design, construction and maintenance standards to mitigate potential flooding due to subdivision road construction.	
2030 Growth Vision Plan, Policies, and Actions 07/20/09	Pages 37-38	To protect the special Flood Hazard Areas. To reduce the amount of impervious surfaces	Moderate	The Plan recommends all development activities be limited to low intensity uses such as open space, recreation, and adequately buffered agricultural activities	
Cumberland County Land Use Policies Plan 07/20/09	Page 28	To protect the Special floods Hazard Area	Moderate	The Plan recommends location criteria for development within the Special Flood Hazard Area	

TITLE & ADOPTION DATE	DOCUMENT REFERENCE	PURPOSE & DESCRIPTION	MITIGATION EFFECTIVENESS	RATIONALE FOR EFFECTIVENESS	MITIGATION STRATEGY
Northeast Vision Plan	Pages 63-69	To preserve and protect the natural features, historic and scenic sites, rural farm stead, and farmland	Moderate	The Plan recommends the adoption of a water & sewer policy for extension into farmland areas; encourage farmer to participate in Volunteer Agricultural District; and protect the riverine system	
2000 International Building Code with N.C. Amendments		To provide specific construction standards to protect the public health, safety, and welfare.	HIGH	This Code provides specific standards for plumbing, building, mechanical and electrical construction.	
N.C. General Statutes 113A Article 4 Sedimentation Pollution Control Act		To protect existing natural resources and the public health, safety, and welfare.	HIGH	This Act provides a mechanism for sedimentation and erosion control including permitting and enforcement measures.	
Mid-Carolina Rural Planning Organization		To provide comprehensive transportation planning within the rural portion of Cumberland County in order to protect the public health, safety, and welfare.	HIGH	This Organization provides specific plans and technical support for all types of transportation planning within the Rural Planning Area.	
Cumberland County Emergency Operations Plan 2/18/02		To provide actions to reduce the vulnerability to a disaster and enhance the recovery from a disaster in order to protect the public health, safety and welfare.	HIGH	This Plan provides actions to be taken to reduce the vulnerability of people and property to disaster establish an effective mechanism to respond in the event of a disaster and identifies critical facilities impacted during a disaster.	

TITLE & ADOPTION DATE	DOCUMENT REFERENCE	PURPOSE & DESCRIPTION	MITIGATION EFFECTIVENESS	RATIONALE FOR EFFECTIVENESS	MITIGATION STRATEGY
Sandhills Area Land Trust (SALT)		A non-profit organization working to preserve the natural beauty and environment of the Sandhills Region. Cumberland county is one of 7 counties working with SALT.	HIGH	This organization works with citizens, developers, municipalities and landowners to retain the Region‘s unique environmental features and positively influence growth and development.	
Cape Fear River Assembly		To provide the highest quality of life within the Cape Fear River Basin.	HIGH	This organization provides scientific study, economic analysis and education in order to make decisions regarding the proper management of the Cape Fear River, its tributaries and adjacent land uses.	
Sustainable Sandhills		To provide regional sustainability planning that preserves natural resources, enhances economic development and improves the quality of life for present and future generations.	HIGH	This Initiative, comprised of members of communities in 6 Counties bordering Fort Bragg and Camp Mackall and the Military, is working to provide a cooperative effort to provide a model for regional sustainability planning.	
Joint Compatible Land Use Study 2003		To provide policies and implementation measures to mitigate conflicts between urban development and Military operations on a Regional basis.	MODERATE	This Study provides compatibility measures and land use policy recommendations that have not been adopted.	Adopt the Land Use Study.

Overall, the local ordinances, policies and programs relevant to hazard mitigation are highly effective in terms of hazard mitigation. Several ordinances should be revised to address visions of future development outlined in the Cumberland County 2030 Growth Vision Plan, Cumberland County Land Use Policies Plan, and the Northeast Vision Plan.

Review of these existing plans, policies, ordinances and programs has resulted in specific actions to create new ordinances (or revise existing ordinances) that would serve to reduce the hazard vulnerability of Godwin. Land use, transportation, utility, recreation and capital improvement plans are designed to provide orderly growth and development without endangering the public health, safety and welfare. Preparation, review and revisions of these types of plans are a continuous process. Goals, Actions and information contained within this Hazard Mitigation Plan will be reviewed and incorporated into the planning process. Additionally, the five-year review of the Hazard Mitigation Plan will include an examination of existing plans, policies, ordinances and programs as part of the Capability Assessment as well as Mitigation Strategies.

Legal Capability

Local governments in North Carolina have been authorized by the State legislature to carry out four broad governmental powers: Regulation, Acquisition, Taxation and Spending. As mentioned previously, the Town of Godwin relies upon Cumberland County for regulatory and taxation staffing functions. The following is a summary of North Carolina enabling legislation granting these broad governmental powers relevant to hazard mitigation.

Regulation

General Police Power

All local governments in North Carolina have been granted broad regulatory powers in their jurisdictions. North Carolina General Statutes [NCGS] bestow the general police power on local governments, allowing them to enact and enforce ordinances, which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people and to define and abate nuisances (including public health nuisances).

Hazard mitigation can be included under the police power to protect the public health, safety, and welfare, therefore municipalities may include requirements for hazard mitigation in local ordinances. Municipalities may also use their power to abate nuisances, which could include by local definition, any activity or condition making people or property more vulnerable to any hazard [NCGS Chapter 160A, Article 8 Delegation and Exercise of the General Police Power to Cities and Towns].

Building Codes and Building Inspection

Counties and municipalities can engage in risk reduction measures focusing on strengthening building codes and requiring retrofitting of existing structures and facilities to protect the public health, safety, and welfare in the event of a natural hazard.

North Carolina has a State mandatory building code, which applies throughout the State [NCGS 143-138 (c)]. However, local jurisdictions may adopt codes for their respective jurisdictions if approved by the State as providing ~~a~~dequate minimum standards" [NCGS 1143-138 (e)]. Local regulations cannot be less restrictive than the State code. Exempted from the State code are public utility facilities other than buildings; liquefied petroleum gas and liquid fertilizer installations, and farm buildings outside municipal jurisdictions. No State permit may be required for structures under $20,000. (Note that exemptions apply only to State, not local permits).

The State legislature has also empowered municipalities to carry out building inspections. NCGS Chapter 160A, Article 19, Part 5 empower municipalities to create an Inspections Department, and enumerates its duties and responsibilities, which include enforcing State and local laws relating to the

construction of buildings, installation of plumbing, electrical, heating systems, etc; building maintenance; and other matters.

Land Use
Through various land use regulatory powers, granted by the State, local governments can control the amount, timing, density, and location of new development. These growth characteristics can determine the level of vulnerability of an area in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enact and enforce zoning, subdivision, floodplain, stormwater and watershed ordinances.

Zoning
Zoning is the most basic tool available to control the use of land. The North Carolina General Statutes 160A-381 gives broad enabling authority for municipalities to use zoning as a planning tool. Counties may also regulate inside a municipal jurisdiction at the request of a municipality, as set forth in NCGS 160A-360(d). The statutory purpose for the grant of power is to promote the health, safety, or the general welfare of the community. Land ~~u~~ses" controlled by zoning include the type of use, such as residential, commercial, industrial, as well as minimum specifications for use such as lot size, building height, setback, density, etc.

Municipalities are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts [NCGS 160A-382]. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

Comprehensive or Master Planning
Within North Carolina, municipal governments are required to create or designate a planning agency in order to exercise the regulatory powers related to land use [NCGS 160A-387]. The planning agency may: prepare studies for an area/neighborhood; determine objectives; prepare and adopt plans for achieving objectives; develop and recommend policies, ordinances and administrative means to implement plans; and perform other related duties [NCGS 160A-361].

NCGS 160A-383 requires that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted ~~i~~in accordance with a plan," the existence of a separate comprehensive planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community.

Subdivision Regulation
Subdivision regulations control the division of land into parcels for the purpose of building a development or sale. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street or a change in existing streets [NCGS 160A-376]. Flood-related subdivision controls typically require that developers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filing or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division of land. Subdivision regulation is limited in its ability to directly affect the type of use made of land or minimum specifications for structures.

Floodplain Regulation
The North Carolina legislature passed the ~~A~~Act to Prevent Inappropriate Development in the One Hundred-Year Floodplain and to Reduce Flood Hazards" to regulate development within floodways [NCGS 143-214.51-214.61]. It serves as a risk reduction or risk elimination tool depending upon local government use. The purpose of this law is to minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage; prevent and minimize loss of life, injuries,

property damage and other losses in flood hazard areas; and promote the public health, safety, and welfare of citizens.
The statute directs, rather than mandates, local government to designate a one hundred-year floodplain; adopt local ordinances to regulate uses in flood hazard areas; enforce those ordinances; and grant permits for use in flood hazard areas that are consistent with the ordinance. The statute established minimum standards for local ordinances and provides for variances for prohibited uses such as:

(a) A flood hazard prevention ordinance adopted by a county or city pursuant to this part shall, at a minimum:

1. Meet the requirements for participation in the National Flood Insurance Program and of this section.
2, Prohibit new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities in the 100-year floodplain except as noted in section (b) below.
3. Provide that a structure or tank for chemical or fuel storage incidental to a use that is allowed under this section or to the operation of a water treatment facility may be located in a 100-year floodplain only if the structure or tank is either elevated above base flood elevation or designed to be watertight with walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydro dynamic loads and the effects of buoyancy.

(b) A flood hazard prevention ordinance may include a procedure for granting variances for uses prohibited under G.S. 143-215.54.
(c) A county or municipality shall notify the Secretary of Crime Control and Public Safety of its intention to grant a variance at least 30 days prior to granting the variance. A variance may be granted upon finding that all of the following apply:

(1) The use serves a critical need in the community.
(2) No feasible location exists for the location of the use outside the 100-year floodplain.
(3) The lowest floor of any structure is elevated above the base flood elevation or is designed to be watertight with walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.
(4) The use complies with all other applicable laws and regulations.

Also, the statute ensures that local ordinances meet the minimum requirements of participation in the National Flood Insurance Program (NFIP), which will afford residents the ability to purchase flood insurance through the NFIP. Additionally, communities with such ordinances will be afforded priority in the consideration of applications for loans and grants from the Clean Water Revolving Loan and Grant Fund.

Acquisition

Local governments can eliminate the risk of hazards through their power to acquire property, either in fee or lesser interest such as an easement. This removes the property from the private marketplace, thereby eliminating or reducing the possibility of inappropriate development. North Carolina legislation empowers counties and municipalities to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain [NCGS Chapter 153A Article 18; Chapter 160A Article 11].

Taxation

The power to levy taxes and special assessments has been delegated to municipalities by the North Carolina legislature [NCGS 160A Article 9]. This power allows local governments to set preferential tax rates for areas unsuitable for development, such as wetlands, thereby discouraging development in

hazardous areas. Local governments may also levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving beach erosion control, or flood and hurricane protection works within a designated area [NCGS 160A 238].

Spending

Counties and municipalities have been granted power to make expenditures in the public interest by the North Carolina General Assembly. An annual budget and a Capital Improvement Plan (CIP) can include hazard mitigation efforts. A CIP serves as a schedule for providing county or municipal services over a specified period of time. Committing to a timetable for the extension of facilities and services, local governments can effectively steer future growth and development and mitigate the impacts of natural hazards. The Town of Godwin does prepare an annual budget, but does not have a CIP.

Fiscal Capability

The North Carolina General Assembly has empowered municipalities to make expenditures in the public interest [NCGS 160A 475]. The primary source for funding these expenditures comes from property taxes. These revenues generally finance critical services available and delivered on a daily basis. Examples of these services include: public utilities, solid waste management, emergency services, health and social services, and schools. The Town of Godwin does not have available funds to support special projects such as hazard mitigation activities. Godwin looks to the following sources for hazard mitigation funding:

Government Funding

Federal and State funds are available to local governments for the development and implementation of hazard mitigation plans. These sources are listed below.

Federal Funding

Hazard Mitigation Grant Program (HMGP) - This program provides funding for hazard mitigation measures following a Presidential disaster declaration. Even though the Federal government supplies the majority of the funds for this program, the program is administered on the State level. HMGP funds can be used for projects such as acquisition or relocation, retrofitting, development of local mitigation standards and comprehensive mitigation plans, structural hazard control and the purchase of equipment to improve preparedness and response.

Pre Disaster Mitigation Program Grants (PDM) - Pre Disaster Mitigation Program provides funding to States and local jurisdictions for cost-effective hazard mitigation actions. FEMA provides PDM grants to States, that in turn, provide sub-grants to local governments for mitigation activities such as planning and the implementation of projects identified through the evaluation of natural and man-made hazards.

Flood Mitigation Assistance Programs - This program (FMAP) furnishes mitigation assistance to States, local jurisdictions and individuals to reduce or eliminate the long-term risk of flood damage to the built environment and real property. FMAP is available on an annual basis and eligibility is based upon a jurisdiction participating in the National Flood Insurance Program and developing a mitigation plan. These funds may be used for elevation and/or dry flood proofing of structures, acquisition of real property, relocation or demolition of structures, as well as other minor structural projects.

National Flood Insurance Program - Participation in this risk-sharing program requires jurisdictions to adopt and enforce floodplain management ordinances designed to reduce future losses.
Buy-Out Programs - Funding is available to buy back floodplains, relocate residents, and demolish structures in order to eliminate or reduce payouts for recurring flood damage.

Earthquake Hazard Reduction Grants - These funds are available to States having a moderate or high risk of seismic activity.
Community Development Block Grants - The Community Development Block Grant (CDBG) is designed to assist counties and municipalities in rehabilitating substandard dwelling units and to expand economic opportunities, primarily for low-to-moderate income families. Additionally, as a result of a Presidential declared disaster, CDBG funds may be used for long-term needs such as acquisition, reconstruction, and redevelopment of disaster-affected areas.

Small Business Administration (SBA) Pre-Disaster Mitigation Loan Program - The purpose of this program is to make low-interest, fixed-rate loans to eligible small businesses for the purpose of implementing mitigation measures to protect business property from damage that may be caused by future disasters. The program is a pilot program, which supports the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Program.

Ability to Pay - The North Carolina Department of Commerce has ranked the 100 counties in an economic tier system due to the Lee Quality Jobs and Business Expansion Act of 1966, which provides for a sliding scale of State tax credits for economic investment. This Act has become North Carolina's primary development tool in an effort to assist smaller rural counties become economically competitive. The most economically depressed counties are ranked in Tier 1 and the most economically prosperous are ranked in Tier 5. These rankings are evaluated annually based on (1) population growth, (2) unemployment rate, and (3) per capita income.

The tier ranking is widely used by the State as a measure of an individual county's ability to pay when applying for State and Federal grants. Cumberland County is ranked as a Tier 4 County.

Non-Government Funding

Another potential source of revenue for local mitigation efforts are the contribution of non-governmental organizations, such as churches, charities community relief funds, the American Red Cross, hospitals, for-profit businesses and non-profit organizations, such as nature conservancy and land trust organizations.

Technical Capability

The Town of Godwin has limited resources for technical staff. The Town relies on the following technical sources:

State and Federal Technical Assistance

Agencies such as the Federal Emergency Management Agency (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. Additionally, they provide technical information on engineering principles, construction methods, costs and suggestions for how techniques can be financed and implemented. Federal agencies such as the U.S. Army Corps of Engineers and Soil Conservation Service also provide similar services.

Statewide Floodplain Mapping Initiative

The State of North Carolina, through the Federal Emergency Management Agency's Cooperating Technical Community partnership initiative, has been designated as a Cooperating Technical State (CTS). As a CTS, the State will assume primary ownership and responsibility for Flood Insurance Rate Maps (FIRM) for all North Carolina communities. This project included conducting flood hazard analysis and producing updated digital FIRM maps. The updated digital FIRM maps for the Town of Godwin were completed and no Special Flood Hazard Area was designated inside the Town of Godwin.

The State has acquired raw elevation data for the six eastern river basins, Cape Fear, Lumber, Neuse, Pasquotank, Tar-Pamlico, and White Oak, which will be used to develop Digital Elevation Models (DEMs) update flood hazard data. Additionally, the updated flood hazard data will provide current, accurate information for local jurisdictions and property owners to make sound site planning and design decisions when building new structures and infrastructure and retrofitting existing structures.

Local Technical Assistance

Cumberland County has a geographic information system (GIS) that provides essential information and technology for hazard response and mitigation. The GIS system provides detailed data on property ownership, land use type and location, values of property and structures, location of the Special Flood Hazard Area and other infrastructure.

This system provides quick access and processing of detailed data that can be used to assist in deployment of resources, before, during and after a natural disaster, as well assists in planning for the mitigation of future disasters.

As previously mentioned in the Unincorporated Area Hazard Mitigation Plan Section entitled Local Departments, Agencies and Organizations, Godwin has access to a responsive and highly trained staff who are capable of implementing mitigation strategies, as well as educating the public about potential hazards and the process necessary to mitigate these hazards.

Political Capability

The Godwin Town Board of Commissioners is knowledgeable of the potential hazards faced by their respective jurisdictions, as well as past history of hazard events and recovery efforts. Additionally, the Cumberland County Joint Planning Board (serving Godwin) is aware of the importance of hazard mitigation planning. Due to this knowledge and understanding, the current and future political climates are expected to be favorable for supporting hazard mitigation strategies.

APPENDIX A - HAZARD PROFILE

CUMBERLAND COUNTY, UNINCORPORATED AREA, FAYETTEVILLE, HOPE MILLS, SPRING LAKE, EASTOVER, STEDMAN, FALCON, WADE, LINDEN AND GODWIN

"The art of progress is to preserve order amid change, and to preserve change amid order."
-Alfred North Whitehead

Cumberland County has determined specific hazards that present the greatest potential for a natural disaster within the County and including its municipalities. The Technical Committee considered the following factors geography, topography, climate, natural features, and history of occurrence in determining jurisdictions vulnerability to each hazard. Also, the Committee reviewed the NOAA history profile of Local Storm Events for Cumberland County and its municipalities. For this update the Technical Committee recommended the removal of volcanoes and tsunamis from the list of hazards. As of this time no volcanoes or tsunamis have any impact on Cumberland County and its municipalities due to the County's geographic location and geology. The following hazards are described in detail and historic references are included:

- Hurricanes
- Tornadoes
- Thunderstorms
- Droughts
- Severe Winter Storms
- Extreme Heat
- Wildfires
- Flooding
- Earthquakes

The Cumberland County Hazard Mitigation Technical Committee was charged to determine which natural hazards to include in this Plan. The Technical Committee reviewed this list and determined that these hazards were still accurate for Cumberland County Multi-jurisdictional Hazard Mitigation Plan Update. **Table A1 - Hazard Identification and Analysis** is a synopsis of the types of Hazards, Likelihood of Occurrence, Intensity Rating, Impact and Summary Rating (one is lowest and five is highest) of hazards in Cumberland County. The summary rating was a conclusion on the likelihood, intensity and impact of each of the hazard that could affect all of Cumberland County. Also this table was based on whether the hazard had impacted in the past to a level of being a presidential or state declared disaster. The source for this table is a combination of hands-on expertise of the Committee, past history of storms that affect all of Cumberland County and the Hazard Mitigation Guide Book. This table applies to the unincorporated area of the County and its municipalities (Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden, and Godwin). Detailed information on the likelihood of occurrence of each hazard within each jurisdiction is contained in the Identifying and Profiling Hazards Section of each plan.

Table A1 - Hazard Identification and Analysis

Type of Hazard & Associated Elements	Likelihood of Occurrence	Intensity Rating	Impact	Summary Rating (1 is least hazardous and 5 is most hazardous)
Hurricanes	Likely	Moderate	Limited	4
Tornadoes	Likely	Moderate	Negligible	3
Thunderstorms	Highly Likely	Moderate	Negligible	3
Droughts	Likely	Mild	Negligible	2
Severe Winter Storms	Likely	Moderate	Negligible	3
Extreme Heat	Highly Likely	Moderate	Negligible	3
Wildfires	Likely	Mild	Negligible	2
Flooding	Possible	Moderate	Negligible	3
Earthquakes	Possible	Mild	Negligible	2

(The Cumberland County Hazard Mitigation Committee determined that landslides/sinkholes, dam/levee failure, volcanoes and tsunamis are hazards that do not need to be addressed.)

Definitions:

Likelihood of Occurrence

Possible – May or may not occur
Likely – In all probability will occur
Highly Likely – Having a high probability of occurring

Intensity Rating

Mild – Gentle in degree of damage. Few cases of power loss, little damage to property, minor loss of life and injuries.

Moderate – Limited in degree of damage. Power outages likely in some areas, damage to some properties, some loss of life and injury.

Severe – **G**reat degree of damage. Long term and extensive power outages, severe property damage, large scale loss of life and injury.

Impact

Limited – Confined within certain limits
Negligible – So small or so little consequences as to warrant little or no attention

Summary Rating

1 is least hazardous and 5 is most hazardous

Note: This table was based on whether the hazard had impacted the County and it‘s municipalities to a level of being a Presidential or State declared disaster. The source for this table is a combination of hands-on expertise of the Committee, past history of storms that affected all of Cumberland County, and the Hazard Mitigation Guide Book.

The following table illustrates the vulnerability of each of the Jurisdictions to the hazards identified in **Table A1 - Hazard Identification and Analysis** above.

Table A2 - Summary of Hazard Vulnerability by Jurisdiction

Hazard Type	Cumberland county	Unincorporated Area	Fayetteville	Hope Mills	Spring Lake	Eastover	Stedman	Falcon	Wade	Linden	Godwin
Hurricanes	X	X	X	X	X	X	X	X	X	X	X
Tornadoes	X	X	X	X	X	X	X	X	X	X	X
Thunderstorms	X	X	X	X	X	X	X	X	X	X	X
Droughts	X	X	X	X	X	X	X	X	X	X	X
Severe Winter Storms	X	X	X	X	X	X	X	X	X	X	X
Extreme Heat	X	X	X	X	X	X	X	X	X	X	X
Wildfires*	X	X	X	*	*	X	X	X	X	X	X
Flooding*	X	X	X	X	X	X	X	X	X	X*	X*
Earthquakes	X	X	X	X	X	X	X	X	X	X	X
* Wildfires are Unlikely to occur due to urbanization. Localized flooding could occur in these jurisdictions.											

Note: The Technical Committee considered the following factors: geography, topography, climate, natural features, and history of occurrence in determining a jurisdiction‘s vulnerability to each hazard. Also, the Committee reviewed the NOAA history profile of Local Storm Events for Cumberland County and it‘s municipalities.

The following section contains detailed information on each hazard and a summary of specific hazard events that have occurred within Cumberland County.

HURRICANES

Description (Source: NC Emergency Management)

Hurricanes are cyclonic storms that originate in tropical ocean waters. Most hurricanes develop in an area 300 miles wide on either side of the equator. Basically, hurricanes are heat engines, fueled by the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, sufficiently warm sea surface temperature, rotational force from the spinning of the earth and the absence of wind shear in the lowest 50,000 feet of the atmosphere.

Hurricanes that impact North Carolina form in the so-called Atlantic Basin, from the west coast of Africa westward into the Caribbean Sea and Gulf of Mexico. Hurricanes in this basin generally form between June 1 and November 30, with a peak around mid-September. As an incipient hurricane develops, barometric pressure at its center falls and winds increase. A weather system with winds at or exceeding 39 mph is designated as a tropical storm, which is given a name and closely monitored by the NOAA National Hurricane Center in Miami, Florida. When winds are at or exceed 74 mph, the tropical storm is deemed to be a hurricane.

Hurricanes have the greatest potential to inflict damage as they cross the coastline from the ocean, which is called landfall. Because hurricanes derive their strength from warm ocean waters, they are generally subject to deterioration once they make landfall. The forward momentum of a hurricane can vary from just a few miles per hour to up to 40 mph. This forward motion combined with a counterclockwise surface flow make the right front quadrant of the hurricane the location of the most potentially damaging winds.

Hurricane intensity is measured using the Saffir-Simpson Scale, ranging from one (1) (minimal) to five (5) (catastrophic). The scale categorizes hurricane intensity linearly based upon maximum sustained winds, minimum barometric pressure and storm surge potential, which are combined to estimate of the potential flooding and damage to property given a hurricane's estimated intensity. This information is presented in the **Table A3 - Saffir - Simpson Scale** below.

Table A3 - Saffir - Simpson Scale

Saffir-Simpson Category	Maximum sustained wind speed			Minimum surface pressure	Storm surge	
	mph	meters/ sec	knots	Millibars (mb)	feet	meters
1	74-96	33-42	64-83	Greater than 980	3-5	1.0-1.7
2	97-111	43-49	84-96	979-965	6-8	1.8-2.6
3	112-131	50-58	97-113	964-945	9-12	2.7-3.8
4	132-155	59-69	114-135	944-920	13-18	3.9-5.6
5	156+	70+	136+	Less than 920	19+	5.7+

Hurricanes are considered to be major hurricanes (the most potentially dangerous) when the Saffir-Simpson classification is three or higher. These intense hurricanes cause over 70 percent of the damage in the USA, even though they account for only 20 percent of tropical cyclone landfalls. **Table A4 - Damage Classification** describes in detail the damage.

Table A4 - Damage Classification

Cat.	Level	Description
1	MINIMAL	Damage primarily to shrubbery, trees, foliage, and unanchored homes. No real damage to other structures. Some damage to poorly constructed signs. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.
2	MODERATE	Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. Coast roads and low-lying escape routes inland cut by rising water two to four hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying areas required.
3	EXTENSIVE	Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water three to five hours before hurricane center arrives. Flat terrain five feet of less above sea level flooded inland eight miles or more. Evacuation of low- lying residences within several blocks of shoreline possibly required.
4	EXTREME	Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. Flat terrain 10 feet of less above sea level flooded inland as far as six miles. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water three to five hours before hurricane center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single- story residences within 2 miles of shore.
5	CATASTROPHIC	Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Major damage to lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water three to five hours before hurricane center arrives. Massive evacuation of residential areas on low ground within five to 10 miles of shore possibly required.

Historical Impact

For the past fifty years, Cumberland County has experienced its share of hurricanes. The most recent Hurricane was Isabel. While this storm created havoc in other areas of the State, Cumberland County only experienced moderate wind and rain from the event. Table A-5 summarizes the historically significant storms with Fran being the County's deadliest storm.

North Carolina as a whole has had an extensive hurricane history dating back to colonial times, with notable nineteenth century storms occurring in 1837, 1846, 1856, 1879, 1883 and 1899. From 1960 to 1990, there was a lull in land falling major hurricanes, with only one (Hurricane Donna in 1960). The 1950s were a busy time for hurricanes in North Carolina, including Hazel, Connie, Diane and Lone. Recent years have proven busy as well, with Hugo (1989), Emily (1993), Opal (1995), Bertha (1996), Fran (1996), Bonnie (1998), Dennis (1999), Floyd (1999), and Isabel (2003) all leaving there mark from the coast to across the State. Specific information regarding the impact of hurricane events on the County is presented in **Table A5 - Significant Hurricanes in Cumberland County 1950 - 2010** below.

Table A5 - Significant Hurricanes in Cumberland County 1950 - 2010

Date	Level of Event	Damages	Indirect costs	*Affected Jurisdiction(s)
9/18/03	Hurricane Isabel	Property damage $7.3 million	1 death in Cumberland County	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
9/15/99	Hurricane Floyd (Wind speed 95kt) I:2	Property damage $3 billion, Crop damage $500 million		Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
9/4/99	Hurricane Dennis	Crop Damage $ 3 million		Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
8/27/98	Hurricane Bonnie (100kt) I:3	Crop Damage $50 million ($51,134,969 in 1999$s)		Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
9/5/96	Hurricane Fran (100kt) I:3	Crop Damage $800 million Statewide	7 deaths, 2 injured in Cumberland County	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
7/12/96	Hurricane Bertha (90kt) I:2	Crop Damage $179 million Statewide		Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
9/26/85	Hurricane Gloria (90kt) I:2	damage unknown		Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
10/15/54	Hurricane Hazel (125kt) I:4	damage unknown($136 million North Carolina damage)		Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin

***** These Events covered each of the jurisdictions in their entirety**.** The Town of Eastover not included in the affected areas due to fact that Town did not incorporated until July 2007. They were a part of the unincorporated area.

TORNADOES

Description (source: FEMA)

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally March through August, although tornadoes can occur at any time of year. They tend to occur in the afternoons and evenings: over 80 percent of all tornadoes strike between noon and midnight.

When a tornado threatens, individuals need to have a safe place to go and time to get there. Even with advances in meteorology, warning times may be short or sometimes not possible. Lives are saved when individuals receive and understand the warning, know what to do, and know the safest place to go.

The intensity, path length and width of tornadoes are rated according to a scale developed by T. Theodore Fujita and Allen D. Pearson. This scale is presented in **Table A6 - The Fujita-Pearson**

Tornado Scale. Tornadoes classified as F0-F1 are considered weak tornadoes, those classified as F2-F3 are considered strong, while those classified as F4-F5 are considered violent.

Table A6 - The Fujita-Pearson Tornado Scale

F-Scale	Damage	Winds (mph)	Path Length (miles)	Mean Width (miles)
F0	Light	40-72	<1	<0.01
F1	Moderate	73-112	1-3.1	0.01-0.03
F2	Considerable	113-157	3.2-9.9	0.04-0.09
F3	Severe	158-206	10-31	0.1-0.31
F4	Devastating	207-260	32-99	0.32-0.99
F5	Incredible	261-318	100	1.0
F6	Inconceivable	319-379	Unknown	Unknown

Historical Impact

Cumberland County has had at least seventeen documented tornadoes from 1950 to 2010. All of these tornadoes occurred within the Unincorporated Area of the County, except for one documented in Hope Mills. Over 80% of the tornadoes were F0 or F1 with maximum winds of 112 miles per hour. Even though t*he Fujita-Pearson Tornado Scale* categorizes F0 or F1 as light to moderate tornadoes, those tornados can still cause significant damage and injuries.

Of all tornadoes reported in North Carolina between 1953 and 1990, 71 percent have been classified as weak, 28 percent as strong, and about one percent as violent. Weak tornadoes have caused three percent of North Carolina tornado deaths, similar to the national figure. Strong tornadoes were responsible for 49 percent of North Carolina deaths (versus 30 percent nationwide), while violent tornadoes caused 48 percent of North Carolina deaths, compared to 70 percent for the nation. Based on State tornado statistics (SERCC, 1996), North Carolina ranks 22nd in total number of tornadoes and 18th in tornado deaths for the period 1953-1995.

Although tornadoes have been reported in North Carolina throughout the year, most of them have occurred in the spring, with 13 percent in March, 11 percent in April, 22 percent in May and 14 percent in June. The most severe tornadoes have also taken place during the spring, with more than half of all F2 or strongest storms occurring in that time period. In addition, Hurricane-induced tornado activity generally occurs close to the coastline as a hurricane makes landfall.

Table A7 - Significant Tornadoes In Cumberland County 1950-2010 lists out all the significant tornadoes in Cumberland County.

Table A7 - Significant Tornadoes in Cumberland County 1950-2010

Date	Level of Event	Damages	Indirect costs	*Affected Jurisdictions(s)
3/27/09	Tornado (F1)	Property Damage $225,000		Hope Mills
12/17/00	Tornado (F0)	Damage unknown		Unincorporated Area Pope Air Force Base
5/28/00	Tornado (F0)	Damage unknown		Hope Mills, Unincorporated Area
11/4/92	Tornado (F0)	Damage unknown		Unincorporated Area
8/28/88	Tornado (F1)	Property Damage $500,000 ($704,564 in1999 Dollars)		Unincorporated Area
5/19/86	Tornado (F2)	Property Damage $250,000		Unincorporated Area
3/28/84	Tornado (F3)	Property Damage $25 million	2 Deaths, 11 injured in Cumberland County	Unincorporated Area
3/28/84	Tornado (F4)	Property Damage $2.5 million		Unincorporated Area
2/11/81	Tornado (F2)	Property Damage $250,000		Unincorporated Area
8/2/74	Tornado (F0)	Property Damage $50,000 ($169,066 in 1999 Dollars)		Unincorporated Area
5/29/73	Tornado (F1)	Property Damage $50,000 ($187,725 in 1999 Dollars)		Unincorporated Area
3/15/71	Tornado (F1)	Property Damage $500,000 ($2,058,025 in 1999 Dollars)		Unincorporated Area
2/22/71	Tornado (F3)	Property Damage $5 million ($20,580,247 in 1999 Dollars),	2 deaths, 60 injured in Cumberland County	Unincorporated Area
12/26/64	Tornado (F1)	Property Damage $5,000 ($26,887 in 1999 Dollars),	1 injured in Cumberland County	Unincorporated Area
9/29/63	Tornado (F2)	Property Damage $500,000 ($2,723,856 in 1999 Dollars)		Unincorporated Area
10/4/60	Tornado (F1)	Property Damage $50,000 ($281,587 in 1999 Dollars)		Unincorporated Area
6/2/59	Tornado (F0)	Property Damage $50,000 ($286,426 in 1999 Dollars)		Unincorporated Area
4/8/57	Tornado (F4)	Property Damage $250,000	8 injured	Unincorporated Area

*Data is not available to demonstrate actual coverage of these events within the named jurisdiction.

THUNDERSTORMS

Description (source: NC Emergency Management)

Thunderstorms are the result of convection in the atmosphere. They are typically the byproduct of atmospheric instability, which promotes the vigorous rising of air parcels that form cumulus and, eventually, the cumulonimbus (thunderstorm) cloud. Instability can be caused by either surface heating or upper-tropospheric (50,000 feet) divergence of air (rising air parcels can also result from air flows over mountainous areas). Generally, the former "air mass" thunderstorms form on warm-season afternoons and are not severe. The latter "dynamically-driven" thunderstorms generally form in association with a cold front or other regional-scaled atmospheric disturbance. These storms can become severe, producing strong winds, frequent lightning, hail, downbursts and even tornadoes.

A typical thunderstorm may be three miles wide at its base, rise to between 40,000 to 60,000 feet in the troposphere, and contain half a million tons of condensed water. Conglomerations of thunderstorms along cold fronts (with squall lines) can extend for hundreds of miles. Thunderstorms contain tremendous amounts of energy derived from condensation of water. The half million tons of condensed water release 300 trillion calories of energy, equivalent to about 100 million kilowatt-hours of electricity, or several Hiroshima-sized atomic bombs.

Natural hazards vulnerability is disproportionately linked to severe thunderstorms. According to the National Weather Service, a severe thunderstorm is a thunderstorm that produces tornadoes, hail 0.75 inches or more in diameter, or winds of 50 knots (58 mph) or more. Structural wind damage may imply the occurrence of a severe thunderstorm.

Hail, formed by the accretion of super cooled liquid water on ice particles in a thunderstorm updraft, can pose a serious threat to agriculture and exposed objects. Likewise, strong winds can potentially wreak havoc on fragile or flimsy structures, or yield secondary damage through the downing of trees. The tornado, however, is by far the greatest natural hazard threat from a severe thunderstorm.

Historical Impact

There have been at least 129 powerful thunderstorms from 1950 to 2010. In order to be included on the following list, these storms have caused injuries, caused property damage or had wind speeds over 60 knots.

Thunderstorms are common throughout North Carolina, and have occurred in all months. Thunderstorm-related deaths and injuries in North Carolina (1959-1992) have peaked during July and August. Additionally, there have been approximately 49 hailstorms documented within the County during this same timeframe. Detailed information regarding these storms is presented in Table A8 - Significant Thunderstorms/ Hail in Cumberland County 1950-2010 below.

Table A8 - Significant Thunderstorms/ Hail in Cumberland County 1950-2010

THUNDERSTORMS

129 thunderstorms 1950-2010; among these 129 were the following significant storms (wind speeds over 60 knots, large damage, deaths and/or injuries):

Date	Level of Event	Damages and Indirect Costs	*Affected Jurisdiction(s)
3/8/05	Thunderstorm, Wind (57 knots)	Property damage $1,000,000	Fort Bragg
5/25/03	Thunderstorm, Wind (60 knots)	Damage unknown	Fayetteville
8/19/02	Lightning	Property damage $85,000	Wade
7/22/02	Lightning	Property damage $180,000	Fayetteville
6/22/01	Thunderstorm, Wind (60 knots)	Damage unknown	Unincorporated Area
6/16/01	Thunderstorm, Wind	Damage unknown	Spring Lake
4/1/01	Thunderstorm, Wind (58 knots	3 injured in Cumberland County	Unincorporated Area
8/8/00	Thunderstorm, Wind (50 knots) Lightning	Damage unknown 1 injury	Hope Mills, Stedman
7/24/99	Thunderstorm, Wind (62 knots)	Damage unknown	Fayetteville
2/28/99	Thunderstorm (Wind 50 knots)	Property Damage $20,000 ($20,267 in 1999 Dollars)	Wade
1/8/98	Thunderstorm, Wind	Property Damage $15,000 ($15,340 in 1999 Dollars)	Godwin
7/20/97	Thunderstorm, Wind (50kots)	Property Damage $15,000 ($15,579 in 1999 Dollars)	Unincorporated Area
4/15/96	Thunderstorm, Wind	Property Damage $20,000 ($21,249 in 1999 Dollars)	Spring Lake, Linden
7/1/95	Thunderstorm, Lightning	Property Damage $30,000 ($33,814 in 1999 Dollars)	Unincorporated Area
1/7/95	Thunderstorm	Property Damage $75,000 ($82,037 in 1999 Dollars)	Fayetteville
8/17/93	Thunderstorm, Lightning	7 injured in Cumberland County	Unincorporated Area
6/9/88	Thunderstorm, Wind	1 injured in Cumberland County	Unincorporated Area
6/24/86	Thunderstorm, Wind (60 knots)	Damage unknown	Unincorporated Area
10/3/85	Thunderstorm, Wind	3 injured in Cumberland County	Unincorporated Area
8/23/83	Thunderstorm, Wind (61 knots)	Damage unknown	Unincorporated Area
6/16/82	Thunderstorm, Wind (63 knots)	Damage unknown	Unincorporated Area
3/24/75	Thunderstorm, Wind (73 knots)	Damage unknown	Unincorporated Area
9/4/66	Thunderstorm, Wind (68 knots)	Damage unknown	Unincorporated Area
8/12/64	Thunderstorm, Wind (73 knots)	Damage unknown	Unincorporated Area
1/21/59	Thunderstorm, Wind (70 knots)	Damage unknown	Unincorporated Area

* Data is not available to demonstrate actual coverage of these events within the named jurisdiction.

49 HAILSTORMS 1950- 2010:			
Date	**Level of Event**	**Damages and Indirect Costs**	***Affected Jurisdiction(s)**
2009-10	2 Hailstorms	Damage unknown	Hope Mills, Unincorporated Area
2007-08	16 Hailstorms (2 with 1.75" diameter, 3 with 1.00" diameter)	Damage unknown	Pope AFB, Hope Mills, Fayetteville, Eastover, Godwin, Stedman, Unincorporated Area
2005-06	7 Hailstorms (1.5" diameter)	Damage unknown	Fort Bragg, Hope Mills, Stedman, Fayetteville, Spring Lake
2003-04	5 Hailstorms (1 with 1.25" diameter)	Damage unknown	Fayetteville, Wade, Eastover, Hope Mills, Unincorporated Area
2000-02	7 Hailstorms (2 with 1.75' diameter)	Damage unknown	Fayetteville, Hope Mills, Spring Lake, Wade, Falcon, Godwin, Unincorporated Area
1995-99	14 Hailstorms (2 with 1.75" diameter, 2 w/ 1.25"diameter)	Damage unknown	Fayetteville, Hope Mills, Spring Lake, Unincorporated Area
1990-94	3 Hailstorms (1 with 1.75 diameter)	Damage unknown	Unincorporated Area
1985-89	11 Hailstorms (4 with 1.75" diameter)	Damage unknown	Unincorporated Area
1980-84	5 Hailstorms (4 with 1.75" diameter	Damage unknown	Unincorporated Area
3/28/84	Hail (1.75-2.5~~)~~	Damage unknown	Unincorporated Area
1975-79	4 Hailstorms	Damage unknown	Unincorporated Area
5/23/75	Hail (3.5~~)~~	Damage unknown	Unincorporated Area
1970-74	2 Hailstorms	Damage unknown	Unincorporated Area
1965-69	1 Hailstorm	Damage unknown	Unincorporated Area

***** Data is not available to demonstrate actual coverage of these events within the named jurisdiction.

DROUGHT

Description (source: National Oceanic and Atmospheric Administration)

A drought is a period of abnormally dry weather, which persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, the duration and the size of the affected area.

There are four different ways that drought can be defined:

Meteorological - a measure of departure of precipitation from normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.

Agricultural - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.

Hydrological - occurs when surface and subsurface water supplies are below normal.

Socioeconomic- refers to the situation that occurs when physical water shortage begins to affect people.

Climatologists use the Palmer Drought Severity Index (PDSI) and the Crop Moisture Index (CMI) to determine the relative conditions of dryness or wetness. The PDSI is an important tool used for evaluating the scope, severity and frequency of prolonged periods of abnormally dry or wet weather. It is used to help delineate disaster areas and indicate the availability of irrigation water supplies, reservoir

levels, range conditions, amount of stock water and potential intensity of forest fires. The CMI is used to measure the status of dryness or wetness affecting warm season crops and field activities.

Historical Impact

The Dust Bowl days of the 1930's affected 50,000,000 acres of land, rendering the farmers helpless. In the 1950's, the Great Plains suffered a severe water shortage when several years went by with rainfall well below normal. Crop yields failed, the water supply fell. California suffered a severe drought some years ago. Rainfall was below normal for 1 1/2 years, and by the time September 1970, rolled around, the fire potential was extremely high and dangerous. Temperatures rose to near the century mark and fires began. Losses were in the tens of millions of dollars.

The worst drought in 50 years affected at least 35 States during the long hot summer of 1988. In some areas the lack of rainfall dated back to 1984. In 1988, rainfall totals over the mid-west, Northern Plains and the Rockies were 50% to 85% below normal. Crops and livestock died and some areas became a desert. Forest fires began over the Northwest and by autumn, 4,100,000 acres had been destroyed. A government policy called "Let Burn" was in effect for Yellowstone National Park. Half of the Park--2,100,000 acres were charred. On September 11th, three inches of snow fell over Yellowstone, helping to extinguish the fire. During the great drought of 1988, Governor Guy Hunt of Alabama led a statewide prayer for rain. It came the very next day, and the thunderstorms continued for weeks (source: Newport, NC Homepage). North Carolina has experienced at least 29 documented droughts between 1950 and 2004. These events were limited to counties in specific regions, rather than statewide events. Generally the Western part of the State has experienced the most events, followed by several events documented in the Coastal Plan. **Table A9 - Significant Droughts in Cumberland County 1950-2010** illustrates the available information for Cumberland County.

Table A9 - Significant Droughts in Cumberland County 1950-2010

DROUGHT			
Date	**Level of Event**	**Damages**	***Affected Jurisdiction(s)**
2002 Summer	Drought	Crop damage $170 million Statewide (73 NC counties, including Cumberland, declared disaster areas).	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin

- This event covered each of the jurisdictions in their entirety.

SEVERE WINTER STORMS

Description (source: NC Emergency Management)

Severe winter storms can produce an array of hazardous weather conditions, including heavy snow, blizzards, freezing rain and ice pellets and extreme cold. Severe winter storms are extra-tropical cyclones (storms that form outside of the warm tropics) fueled by strong temperature gradients and an active upper-level jet stream. The winter storms that impact North Carolina generally form in the Gulf of Mexico or off the southeast Atlantic Coast. Few of these storms result in blizzard conditions, defined by

the presence of winds in excess of 35 mph, falling and blowing snow, and a maximum temperature of 20° Fahrenheit.

While the frequency and magnitude of snow events are highest in the mountains due to elevation, the geographical orientation of the mountains and piedmont contribute to a regular occurrence of freezing precipitation events (e.g., ice pellets and freezing rain) in the piedmont. Such ice events (up to and including ice storms) are often the result of cold air damming. Cold air damming is a shallow, surface-based layer of relatively cold; stably stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then becomes either super cooled (liquid below the melting point of water) or re-freezes. In the former case, super cooled droplets can freeze on impact (freezing rain), while in the latter case; the re-frozen water particles are ice pellets (or sleet).

Historical Impact

In Cumberland County, winter storm activity is moderate compared to the rest of the State. There have only been 12 significant winter storm events from 1950-2010. On average, there have been no more than 4 significant storms each year.

The entire State of North Carolina has a likelihood of experiencing severe winter weather. The threat varies by location and by type of storm. Coastal areas typically face their greatest threat from Nor'easters and other severe winter coastal storms. These storms can contain strong waves and result in extensive beach erosion and flooding. Freezing rain and ice storms typically occur once every several years at coastal locations, and sever snowstorms have been recorded occasionally in coastal areas. **Table A10 - Significant Winter Storms in Cumberland County 1950-2004** illustrates the impact his event has had upon the County.

Table A10 - Significant Winter Storms in Cumberland County 1950-2010

12 WINTER STORMS			
Date	**Level of Event**	**Damages**	***Affected Jurisdiction(s)**
3/2/10	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
2/12/10	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
1/29/10	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
1/20/09	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
1/19/08	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
2/1/07	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
12/26/04	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
2/26/04	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
1/26/04	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
1/3/02	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
12/3/00	Winter Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
1/18-28/00	4 Winter Storms	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
12/23/98	Ice Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
2/3/96	Extreme Cold	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
2/2/96	Ice Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
1/11/96	Ice Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin
1/6/96	Ice Storm	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin

*These Events covered each of the jurisdictions in their entirely.

EXTREME HEAT

Description (source: FEMA)

Heat kills by pushing the human body beyond its limits. Under normal conditions, the body's internal thermostat produces perspiration that evaporates and cools the body. However, in extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature. Most heat disorders occur because the victim has been overexposed to heat or has over exercised for his or her age and physical condition. Other conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. A prolonged drought can have a serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock.

Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air nears the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

Historical Impact

In a normal year, approximately 175 Americans die from extreme heat. Young children, elderly people, and those who are sick or overweight are more likely to become victims. Between 1936 and 1975, nearly 20,000 people succumbed to the effects of heat and solar radiation. Because men sweat more than women, men are more susceptible to heat illness because they become more quickly dehydrated. Sunburn can significantly slow the skin's ability to release excess heat. People living in urban areas may be at a greater risk from the effects of a prolonged heat wave than people living in rural regions. An increased health problem can occur when stagnant atmospheric conditions trap pollutants in urban areas, thus adding contaminated air to excessively hot temperatures. Table A11 - Extreme Heat in Cumberland County 1950-2010 illustrates documented occurrences of extreme heat in Cumberland County.

Table A11 - Extreme Heat in Cumberland County 1950-2010

EXTREME HEAT			
Date	**Level of Event**	**Damages**	***Affected Jurisdiction(s)**
8/10/07	Extreme Heat	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Eastover, Stedman, Falcon, Wade, Linden and Godwin
7/22/98	Extreme Heat	Damage unknown	Unincorporated area, Fayetteville, Hope Mills, Spring Lake, Stedman, Falcon, Wade, Linden and Godwin

*This Event covered each of the jurisdictions in their entirety.

WILDFIRES

Description (NC Emergency Management)

A wildfire is an uncontrolled burning of grasslands, brush or woodlands. The potential for wildfire depends upon surface fuel characteristics, recent climate conditions, current meteorological conditions and fire behavior. Hot, dry summers and dry vegetation increase susceptibility to fire in the fall, a particularly dangerous time of year for wildfire.

Historical Impact

In North Carolina, wildfire potential has been assessed using State Forest Service records for the period 1950-1993. This data suggests that the southern coastal plain is the most vulnerable area for wildfires in North Carolina.

As development has spread into areas which were previously rural, new residents have been relatively unaware of the hazards posed by wildfires and have used highly flammable material for constructing buildings. This has not only increased the threat of loss of life and property, but has also resulted in a greater population of people less prepared to cope with wildfire hazards. Wildfires have not been documented within Cumberland County.

FLOODING

Description (NC Emergency Management)

Flooding is a localized hazard that is generally the result of excessive precipitation. Floods can be generally considered in two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin.

Flooding is the most common environmental hazard, due to the widespread geographical distribution of river valleys and coastal areas, and the attraction of human settlements to these areas. Usually, Presidential declarations of major disasters are associated with flash and general floods.

Flash floods occur within a few minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Flash floods can destroy buildings and bridges, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides. Most flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in a local area, or by heavy rains from hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urban areas where much of the ground is covered by impervious surfaces. Roads and buildings generate greater amounts of runoff than typical forested land. Fixed drainage channels in urban areas may be unable to contain the runoff that is generated by relatively small, but intense, rainfall events.

The severity of a flooding event is determined by a combination of river basin terrain, local thunderstorm movement, past soil moisture conditions and the degree of vegetative clearing. Abnormal weather patterns may also contribute to flooding of a local area. Large-scale climatic events, such as the El Nino-Southern Oscillation in the Pacific, have been linked to increased storm activity and flooding in the United States. Nationally, July is the month in which most flash flooding events occur, and nearly 90 percent of flash floods occur during the April through September period.

While flash floods occur within hours of a rain event, general flooding is a longer-term event, and may last for several days. The primary types of flooding are riverine flooding, coastal flooding and urban flooding.

Periodic flooding of lands adjacent to non-tidal rivers and streams is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal watercourse, some of the above-normal stream flow spills over onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river. The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplains are divided into areas that experience different levels of floods depending on their elevation. A 100-year flood will inundate the 100-year zone of that floodplain. A 500-year flood will inundate the 500-year flood zone, which is higher in elevation. The chances of a 100-year flood event occurring for any given year are 1 percent; for a 500-year event, the chances drop to 0.2 percent for any one-year period. The Army Corps of Engineers calls a 100-year flood an Intermediate Regional Flood, while a Standard Project flood describes a major flood that could be expected to occur from a combination of severe meteorological and hydrologic conditions. Most dam and flood-related structures have been designed to meet 100-year flood conditions.

Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall. These conditions are produced by hurricanes during the summer and fall, and nor'easters and other large coastal storms during the winter and spring. Storm surges may overrun barrier islands and push seawater up coastal rivers and inlets, blocking the downstream flow of inland runoff. Thousands of acres of crops and forestlands may be inundated by both saltwater and freshwater. Escape routes, particularly from barrier islands, may be cut off quickly, stranding residents in flooded areas and hampering rescue efforts.

Urban flooding occurs where there has been development within stream floodplains. This is partly a result of the use of waterways for transportation purposes in earlier times. Sites adjacent to rivers and coastal inlets provided convenient places to ship and receive commodities. The price of this accessibility was increased flooding of the ensuing urban areas. Urbanization increases the magnitude and frequency of floods by increasing impermeable surfaces, increasing the speed of drainage collection, reducing the carrying capacity of the land and, occasionally, overwhelming sewer systems.

For coastal areas, flooding potential associated with hurricanes is mapped in Inundation Maps prepared as part of the Eastern North Carolina Hurricane Evacuation Study, aerial photographs of the coastal area (updated at five-year intervals by the North Carolina Coastal Resources Commission), and flood maps prepared for the National Flood Insurance Program.

Historical Impact

All parts of North Carolina have been flooded with rainfall associated with tropical storms and hurricanes. The severity of a flooding event is determined by a number of local factors, including river basin topography, precipitation patterns, recent soil moisture conditions and vegetative State. The mountains were devastated by hurricane-induced rains in 1916, 1928, 1940, and 1995 (Opal); the Piedmont was impacted in those years plus 1945; and the Coastal Plain was adversely affected in 1945, 1954, 1955, 1996 (Fran), and 1999 (Floyd).

In Cumberland County, large amounts of impervious surfaces in urban areas increase runoff amounts and decrease the lag time between the onset of rainfall and stream flooding. Manmade channels may also constrict stream flow and increase flow velocities. Due to these conditions, each jurisdiction has the potential to experience localized flooding regardless of proximity to the 100-year floodplain and/or topography. Localized flooding is also addressed in **Table A2 - Summary of Hazard Vulnerability by Jurisdiction** of this Appendix. Flood information is presented in **Table A12 - Significant Flash Floods/Floods in Cumberland County 1950-2010** below.

Table A12 - Significant Flash Floods/Floods in Cumberland County 1950-2010

32 FLASH FLOODS (Due to dam break, heavy rain or mudslide)			
Date	**Level of Event**	**Damages and Indirect Cost**	***Affected Jurisdiction(s)**
2009-2010	4 Flash Floods	$20,000	(1) Falcon, (1) All Jurisdictions, (2) Unincorp-orated Area
2007-2008	3 Flash Floods	$1,500,000	Fayetteville, Unincorporated Area
2005-2006	2 Flash Floods	Damage unknown	Fayetteville
2003-2004	8 Flash Floods	$2.1 million	(3) Fayetteville, (5) Hope Mills
2000-2002	5 Flash Floods	Damage unknown	(3) Fayetteville, (1) Hope Mills, (1) Godwin
1995-1999	8 Flash Floods	Damage unknown	(1) Fayetteville, (1) Stedman, (6) Unincorporated Area
1990-1994	1 Flash Flood	Damage unknown	Unincorporated Area
1989	1 Flash Flood	Excess of $10 million, 2 deaths	Fayetteville
FLOODING			
Date	**Level of Event**	**Damages and Indirect Cost**	***Affected Jurisdiction(s)**
2003-2004	Flood	$150,000	Unincorporated Area, Hope Mills
2000-2002	N/A		
1995-1999	Heavy Rain, Flooding	Damage unknown	Fayetteville, Unincorporated Area
1990-1994	N/A		
1950-1989	Flooding	Damage unknown	(4) Fayetteville, Unincorporated Area

*Data is not available to demonstrate actual coverage of these events within the named jurisdiction.

EARTHQUAKES

Description (NC Emergency Management)

Earthquakes are geologic events that involve movement or shaking of the earth's crust. Earthquakes are usually caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the earth's outer crust. These fault planes are typically found along borders of the earth's 10 tectonic plates. These plate borders generally follow the outlines of the continents, with the North American plate following the continental border with the Pacific Ocean in the west, but following the mid-

Atlantic trench in the east. As earthquakes occurring in the mid-ocean trench usually pose little threat to humans, unlike earthquakes located along continental boundaries, the greatest earthquake threat in North America is along the Pacific coast.

The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength, a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 244 - fold increase in energy (USGS, 1996). Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale. It is a 12-level scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, with a corresponding to imperceptible (instrumental) events, IV corresponding to moderate (felt by people awake), to XII for catastrophic (total destruction). A detailed description of the Modified Mercalli Scale of Earthquake Intensity (and its correspondence to the Richter Scale) is given in the table below.

Table A13 - Modified Mercalli Scale of Earthquake Intensity

Scale	Intensity	Description of Effects	Maximum Acceleration (mm/sec)	Corresponding Richter Scale
I	Instrumental	Detected only on seismographs	<10	
II	Feeble	Some people feel it	<25	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	<50	
IV	Moderate	Felt by people walking	<100	
V	Slightly Strong	Sleepers awake; church bells ring	<250	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<500	<5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls	<1000	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	<2500	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<5000	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7500	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<9800	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>9800	>8.1

Historical Impact

Earthquakes are relatively infrequent, but not uncommon in North Carolina. There are no records indicating any occurrences of a significant earthquake in Cumberland County. The earliest North Carolina earthquake on record is that of March 8, 1735, near Bath. This event was probably less than intensity V (Slightly strong; sleepers awake). The great earthquake of 1811 centered in the Mississippi Valley near New Madrid, Missouri, was felt throughout North Carolina. Intensity VI (Strong; trees sway) effects were observed in the western part of the State. The most property damage in North Carolina ever attributed to an earthquake, however, was caused by the August 31, 1886, Charleston, South Carolina shock. The quake left about 65 people dead in Charleston and led to chimney collapses, fallen plaster and cracked walls in Abbottsburg, Charlotte, Elizabethtown, Henderson, Hillsborough, Raleigh, Waynesville, and Whiteville. On February 21, 1916, the Asheville area was the center for a large intensity VI earthquake, which was felt in Alabama, Georgia, Kentucky, South Carolina, Tennessee, and Virginia - some 518,000 square kilometers in all. Subsequent minor earthquakes have caused damage in North Carolina in 1926, 1928, 1957, 1959, 1971, 1973 and 1976.

Figure (1) shows the epicenters of earthquakes occurring in and around North Carolina from 1977 to 1996. Epicenters are generally concentrated in the active Eastern Tennessee Seismic Zone, which is second in activity in the eastern US only to the New Madrid Fault.

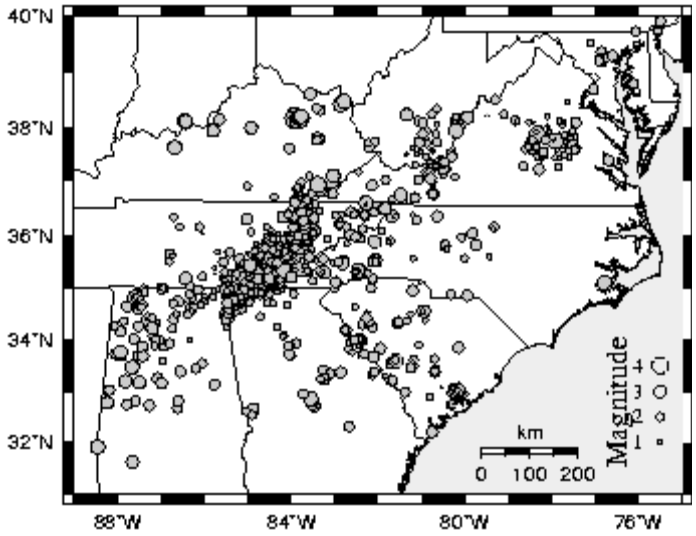


Figure (1) Shadedcircles show the epicenters of earthquakes in the southeastern United States for the period 1977 through 1996 (Snoke and Chapman, 1997)

North Carolina's vulnerability to earthquakes decreases from west to east in relation to the Eastern Tennessee Seismic Zone. Generally, there are three different zones of seismic risk in North Carolina that correspond to different effective peak velocity-related accelerations of ground movement. The eastern portion of the State faces minimal effects from seismic activity. Locations in the middle and southeastern areas of the State face a moderate hazard from seismic activity, while the area from Mecklenburg County west through the Blue Ridge Mountains faces the greatest risk from seismic activity. These different levels of risk correspond to proximity to areas with historical seismic activity and changes in topography.

The steep topography of western North Carolina exacerbates the potential for damage from this area of seismic activity. There could be significant ground movement on steep slopes from seismic activity. This could result in human injuries, damage to property, and road closures, which would add difficulty to bringing in relief supplies and fire protection equipment. Cumberland County has not experienced any documented earthquakes or any minimal effects from one in another part of the State.

APPENDIX B - CRITICAL FACILITIES RANKING

CUMBERLAND COUNTY, UNINCORPORATED AREA, FAYETTEVILLE, HOPE MILLS, SPRING LAKE, EASTOVER, STEDMAN, FALCON, WADE, LINDEN AND GODWIN

The Technical Committee, as a team ranked the critical facilities according to their need during the time of a natural disaster. According to this ranking, the Emergency Management Command Center (located in the Cumberland County Law Enforcement Center), key communications facilities such as telephone switching stations and electrical transformers (located in various locations in the County), hospitals and rest homes are the top priority facilities as shown below:

1. **Emergency Management Command Center**

2. **Major Communications Facilities** (i.e. Telephone switching stations, electrical transformers, emergency service communication towers)

3. **Hospitals & Rest Homes**
   a. Hospitals (Cape Fear Valley Medical Center, Highsmith-Rainey Hospital, and (Veterans Administration Medical Center)
   b. Rest Homes (VA Rest Homes, N.C. State Veterans Home, and private facilities)

4. **Fire-EMS**
   a. Fire Stations
   b. Ambulance
   c. Dispatch Centers (Cumberland County Law Enforcement Center, City of Fayetteville, Spring Lake, and Hope Mills

5. **Police** (Law Enforcement Center, Fayetteville Police Station, Hope Mills Police Station, and Spring Lake Police Station)

6. **Emergency Shelters** (Smith Recreation Center ~~–~~Special Needs Center", Southview Senior High School, Spring Lake Middle School, Mac Williams Middle School, Pine Forest Senior High School, 71st Senior High School, Kiwanis Recreation Center, and others)

7. **Communications**
   a. Major Communications Centers (Sprint Toll building and Substations)
   b. Cell Towers (?)
   c. Emergency Services Communication Towers – 2

8. **Utilities**
   a. Water Plants (including water storage facilities)
      Hoffer Treatment Facility
      Glenville Lake Facility
      Town of Falcon Water Storage Tank
      Town of Spring Lake Water Storage Tank
      Town of Stedman Water Storage Tank
      Town of Wade Water Storage Tank

   b. Power Plants and Substations

c. Sewer Treatment Facilities (Cross Creek Facility, Rockfish Creek Facility, and Spring Lake Facility)
d. Major Petroleum and Gas Depots

9. **Schools** (Public, Private, and higher education –Fayetteville State University, Methodist College, Fayetteville Technical Community College)

10. **Roads and Bridges** (Transportation)
a. Roads
b. Bridges
c. Dams
d. Transit Facilities
Fast Facility
School Buses
Private (Bus Station)

11. Government
a. City Halls & Courthouse
b. Other government buildings
Human Services Facilities
Libraries
Non-Critical Support facilities (e.g. Parks & Recreation Centers, Old Courthouse)

12. **Public Housing Projects** (12)
Grove View Terrace
Delona Gardens
Campbell Terrace
Hillside Manor
Melvin Place
Point Place
Murchison Townhouses
Blueberry Place
Holland Homes
Lewis Heights
Stanton Arms
McNeill Apartments

13. Hazard Materials Facilities

APPENDIX C - METHODOLOGY

The methodology used to provide the data contained within the Vulnerability Assessment of Cumberland County, the Unincorporated Area and the individual municipalities is presented in this Appendix. The methodology specifically applies to the tables illustrating Private Buildings Vulnerability Assessment and Public Buildings and Critical Facilities Vulnerability Assessment (for all Hazards and Flooding) for each jurisdiction. The methodology is presented in three sections: Base Data and Definitions, Current Conditions and Potential Future Conditions.

Base Data and Definitions

Data Sources

Most of the data contained within the tables is based on a download of the Cumberland County OASIS tax records as of March 2010. The general information (fields) found in this download included assessed value, building value, land use code, zoning, property owner information, building count, number of units and etc.

Employment data was gathered from the Population and Economic Study for the Fayetteville Urbanized Area and Cumberland County 2000-2030, December 2002, prepared by the Fayetteville Area Metropolitan Planning Organization. Household population estimates were based on data from Summary File 3 of the 2000 Census.

Definition of Planning Areas

ArcView GIS has been used to work with this OASIS download. Each PIN was identified according to location within each jurisdiction, the Unincorporated Area of the County, and the defined flood hazard area. Each PIN was assigned codes for land use, ownership (private, non-profit, public), and critical facilities. ArcView was used to calculate the information needed for the Vulnerability Assessment tables according to jurisdiction.

Defined Flood Hazard Area

The flood hazard area was based on the new digital FIRM maps that were received from the State and available on the website www.ncfloodmaps.com .

Current Conditions

The Planning Staff of the City of Fayetteville Planning Department, Cumberland County Joint Planning Board, Spring Lake Planning Department, and the Hope Mills Planning Department created the methodology used in preparing this information.

Private Buildings

ArcView was used to calculate Type of Development, Number of Existing Buildings, and Current Value categories contained within the tables. The Current Number of People data was calculated using a separate method for residential buildings and the non-residential buildings (commercial, industrial and other).

Household Population in Residential Buildings

ArcView was used to calculate the number of residential buildings by type within each planning area. An EXCEL spreadsheet was used to calculate the number of housing units by type (multiplying the number of residential buildings by an assumed number of housing units per building type). The number of

housing units by type was multiplied by an occupancy rate by type contained within Summary File 3 of the 2000 Census, thus giving the number of occupied units by type. This number of occupied units by type was multiplied by an average household size by type (contained within Summary File 3 of the 2000 Census), resulting in the Current Number of People within Residential Buildings.

Number of Employees in Commercial, Industrial and Other Buildings
Data from the Population and Economic Study for the Fayetteville Urbanized Area and Cumberland County 2000-2030, December 2002, was used to estimate the number of employees per building type. This data was summarized by PIN and joined to the OASIS download used for the Hazard Mitigation Plan.

Public Buildings and Critical Facilities

ArcView was used to calculate Type of Development**,** Number of Existing Buildings**,** and Current Value categories contained within the tables. The Current Number of People data was obtained through 2000 Census information, the Population and Economic Study, and the Case Study Method.

Potential Future Conditions

The Planning Staff of the City of Fayetteville Planning Department created the methodology used to prepare these projections.

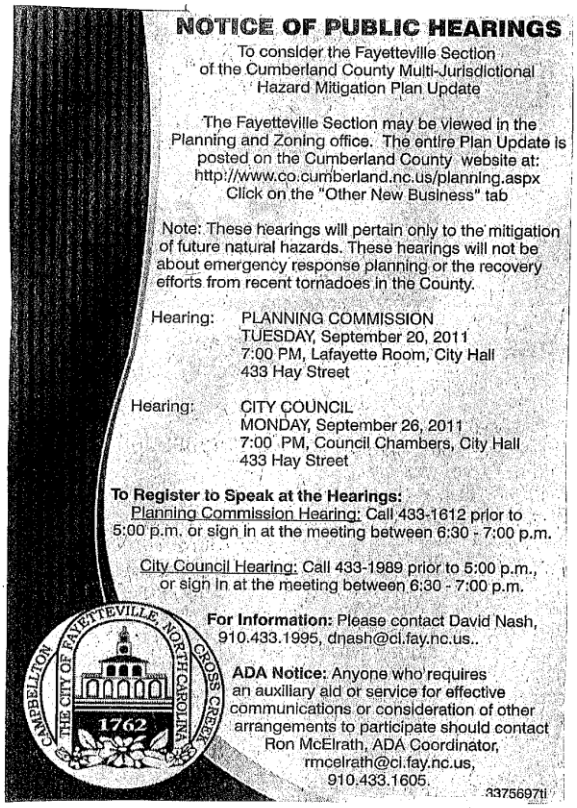
Private Buildings

An EXCEL file was used to project the future number of private buildings as a function of the current number of private buildings, the number of years to the projection year and an assumed growth rate. The assumed growth rate was calculated by using the rate function in EXCEL using the 2000 Census population figures and the 2030 projected population figures in the Population and Economic Study for the Fayetteville Urbanized Area and Cumberland County 2000-2030, December 2002. A growth rate was calculated for each jurisdiction. This annual population growth rate was used to project the Number of Private Buildings, their Projected Value and projected Number of People to the Year 2015.

Public Buildings and Critical Facilities

The projected number of public buildings and critical facilities in the year 2025, their projected value and the projected number of people associated with the critical facilities was derived from the Case Study Method described above. Infrastructure data was projected using EXCEL files described above; it was assumed that infrastructure would increase at the same rate of growth as population.

APPENDIX D - PUBLIC HEARING NOTICES



NOTICE OF PUBLIC HEARINGS

To consider the Fayetteville Section of the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update

The Fayetteville Section may be viewed in the Planning and Zoning office. The entire Plan Update is posted on the Cumberland County website at: http://www.co.cumberland.nc.us/planning.aspx Click on the "Other New Business" tab

Note: These hearings will pertain only to the mitigation of future natural hazards. These hearings will not be about emergency response planning or the recovery efforts from recent tornadoes in the County.

Hearing: PLANNING COMMISSION
TUESDAY, September 20, 2011
7:00 PM, Lafayette Room, City Hall
433 Hay Street

Hearing: CITY COUNCIL
MONDAY, September 26, 2011
7:00 PM, Council Chambers, City Hall
433 Hay Street

To Register to Speak at the Hearings:
Planning Commission Hearing: Call 433-1612 prior to 5:00 p.m. or sign in at the meeting between 6:30 - 7:00 p.m.

City Council Hearing: Call 433-1989 prior to 5:00 p.m., or sign in at the meeting between 6:30 - 7:00 p.m.

For Information: Please contact David Nash, 910.433.1995, dnash@ci.fay.nc.us..

ADA Notice: Anyone who requires an auxiliary aid or service for effective communications or consideration of other arrangements to participate should contact Ron McElrath, ADA Coordinator, rmcelrath@ci.fay.nc.us, 910.433.1605.

3375697ll

PUBLIC NOTICE
CUMBERLAND COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION
PLAN UPDATE

The Cumberland County Joint Planning Board will hold a Public Hearing on the Cumberland County Multi-jurisdictional Hazard Mitigation Plan Update on Tuesday, July 19, 2011, at 7:00 pm at the Historic Courthouse located at 130 Gillespie St, Hearing Room #3, Fayetteville. A copy of the updated plan can be viewed at the Planning & Inspection Dept and at www.co.cumberland.nc.us/planning/aspx under "Other New Business tab".
7/8 3300838

PUBLIC NOTICE
CUMBERLAND COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN
UPDATE

The following Towns will hold a Public Hearing on the Cumberland County Multi-jurisdictional Hazard Mitigation Plan Update:
Town of Hope Mills: 7:00 pm, August 15, 2011 Hope Mills Town Hall located at 5770 Rockfish Rd, Hope Mills NC
Town of Spring Lake: 7:00 pm, August 22, 2011 Spring Lake Municipal Building located at 300 Ruth St, Spring Lake, NC
A copy of the updated plan is available for review at each Town Hall, Planning & Inspections Dept, and online at www.co.cumberland.nc.us/planning/aspx under "Other New Business" tab.
8/8 3333746

PUBLIC NOTICE
The Eastover Town Council will meet at 7:00 p.m. on Tuesday, September 6, 2011 in the Eastover Community Building at 4008 School Street, Eastover to hear the following:
P11-38 rezoning .6+/- acs C(P) to R20 or more restrictive zoning 1882 Dunn Rd owner Eunice Bain (Eastover); and
Cumberland County Multi-jurisdictional Hazard Mitigation Plan Update. A copy of the updated plan is available for review at the Town Hall, Planning & Inspection Dept, and online at www.co.cumberland.nc.us/planning/aspx under "Other New Business tab".
8/23, 30 3356792

PUBLIC NOTICE
The Cumberland County Board of Commissioners will meet at 6:45 p.m. on September 19, 2011 in room 118 of the County Courthouse at 117 Dick Street to hear the following:
P11-22 Rezoning 23.78+/- acs A1 to R15 nw side Ramsey St ne Reaves Bridge Rd owner KM Taylor Trust
County Multi-jurisdictional Hazard Mitigation Plan Update A copy of the updated plan is available for review at Clerk to the Board, Planning & Inspections Dept, and online at www.co.cumberland.nc.us/planning/aspx under "Other New Business" tab.
9/5, 12 3368847

PUBLIC NOTICE

CUMBERLAND COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

The Godwin Board of Commissioners will hold a Public Hearing on the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update on September 19, 2011 at 7:30 pm in Godwin Town Hall located at 4924 Markham Street, Godwin, NC.

A copy of the updated plan is available for review at Town Hall, Planning & Inspections Dept, and online at www.co.cumberland.nc.us/planning/aspx under "Other New Business" tab.

9/7, 2011

PUBLIC NOTICE
NORTH CENTRAL LAND USE PLAN &
HAZARD MITIGATION PLAN

The Linden Town Board will hold Public Hearings on the Proposed North Central Area Plan and the Cumberland County Multi-Jurisdictional Hazard Plan Update on Tuesday, August 16, 2011, at 7:30 pm at the Linden Town Hall, located at 9444 Academy St, Linden, NC. A copy of the documents can be viewed at the Linden Town Hall and online at http://www.co.cumberland.nc.us/planning.aspx.
8/2,9,2011

PUBLIC NOTICE
CUMBERLAND COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN
UPDATE

The following Towns will hold a Public Hearing on the Cumberland County Multi-Jurisdictional Hazard Mitigation Plan Update:
Town of Falcon: 7:00 pm, August 1, 2011 Falcon Town Hall located at 7156 S West St, Falcon NC
Town of Stedman: 7:00 pm, August 4, 2011 Stedman Town Hall located at 5110 Front St, Stedman, NC
Town of Wade: 7:00 pm, August 9, 2011 Wade Town Hall located at 7118 Main St, Wade NC
A copy of the updated plan is available for review at each Town Hall, Planning & Inspections Dept, and online at www.co.cumberland.nc.us/planning/aspx under "Other New Business" tab.
7/22 3315735

This document was coordinated and prepared by the

Comprehensive Planning Section of the
Cumberland County Planning & Inspections Department
and
The Fayetteville Planning Department

April 2011